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Technical Articles

Features

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More Steel Capacity!

WELL, what d'you know! It's just like old times again—back to 1940-41 when Paradiso and Means, and Melvin de Chazeau and Gano Dunn, were all figuring and refiguring, and extrapolating their colored curves to find out how much more steel capacity the country needed. The government ball-gazers then rather liked 10,000,000 ingot tons more, as based on national-income projections, and Gano Dunn came out with somewhat less in a Presidential report. But that year-end brought Pearl Harbor. The sharp pencil work was erased in all-out war that demonstrated there's never enough of anything.

The U. S. Department of Labor has just completed a projection of capital requirements for full employment national-income curves, thereby establishing capacity targets for basic industries. The targets are of a size to widen the eyes. Equally eye-widening is the implication of 10 to 15 million unemployed through failure to match the targets.

The report asks for 98 to 120 million ingot tons of steel in 1950, against today's 91 million plus tons. So, time is short! Three years will slip by without the gap apparently being closed; for current industry plans include practically no physical expansion in blast furnaces, bessemers and openhearths. Maybe the report is right and industry wrong. Or, maybe not! Or, maybe there are just enough soft spots in straight-line statistical correlations between two uncertain variables to make steel producers understandably wary. After all, nature abhors a straight line, and production figures are no exception. The high spots are nice indeed, but from a practical standpoint the eye must not stray too far from the lows—that's where the shirts are lost.

Today consumers are irritably waiting for steel. But far fewer would be waiting if production of some 20,000,000 ingot tons had not been lost in 1946 for various reasons. And there won't be many waiting if the industry manages six months' production without further frustrating interruptions. It's well nigh unbelievable, but sales staffs in many steel companies are feeling a stir of life—still a faint quiver, to be sure, but a token of considerable animation by midyear.

Present capacity—along with normal yearly increments in improved equipment, higher speeds and technology—looks pretty adequate when matched against past averages of per capita steel consumption. But if 1950 comes with its demand of over 100 million ingot tons, there will be few sad faces in Pittsburgh and Chicago. The tonnage may even be squeezed out. Why, once they really begin squirting oxygen in all the blast furnaces and openhearths, the problem could well become one of material handling, in trying to cram in the raw materials. And if that fails to turn the trick, the industry will just have to take its punishment—there will be the inevitable Congressional demands that sponge iron plants be built at every mine entrance.

T. W. Lippert

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► Experimental cars with high compression engines are now under test utilizing superior fuels which will be available to the public in the future. Increased mileage of up to 40 pct is reported.

► Liquid Envelope, a peelable plastic film will soon protect most stainless steel sheet sold by Eastern Stainless Steel Corp. Aside from eliminating use of paper it greatly improves die life because the film is finally peeled off by the ultimate consumer.

Eastern is also installing a degreasing machine to clean stainless sheets prior to final inspection, thereby avoiding the costly and time-consuming practice of using chalk for de-oiling and degreasing.

► The American occupation forces in Germany are being referred to as "Russians with creases in their pants." Occasional robberies, drunkenness and the like are held responsible for some of the German grumbling.

► The Interior Dept. may soon turn over to War Assets Administration the job of disposing of some $150 million worth of surpluses in U. S. territorial possessions, including more than $25 million in grazing and mineral lands. Officials are now quietly discussing the matter.

► Production of metallic lithium at half the present cost, or for less than $6 per lb, is said to be commercially feasible by means of vacuum thermal reduction in the micron range of pressures.

► New wrinkle in mass production is the pouring of concrete houses in one piece in steel forms which can be simply disassembled and re-used.

► The addition of a brightener solution to the conventional copper cyanide plating bath may lower plating costs by eliminating buffing of copper deposits. It also cuts racking and handling time in the plating shop.

► A 15-lb electronic telemetering device, developed by GE to ride in the nose of V-2 rockets, transmitted 28 items of information to the ground, each in 1/35 of a sec during recent tests at White Sands, N. Mex. Known comparable foreign equipment weighs six times as much and has three times as many electronic tubes.

► Whether or not the freight car production goal of 7000 cars a month set by CPA, or 10,000 demanded by ODT, is reached may depend on the railroads to a larger extent than some Washington observers now think. At current prices and consumption, for instance, the roads' total bill for steel rails alone will be almost $13 million higher than it was in 1946.

► Interior Secretary Krug's bold mineral resources survey idea may run into rough sledding on Capitol Hill because its cost is estimated at a billion dollars, just half the initial expense of the atomic bomb project. But it is believed that his efforts may arouse an unsuspecting nation to the seriousness of its plight. Incidentally, Mr. Krug repeated a statement made last month in these pages--that importation of raw materials, including minerals, would be more beneficial than using gold as a medium of exchange.

► OIT is expected to ask that export control be continued on copper, lead, tin, zinc and antimony beyond the scheduled June 30 expiration date. Steel, because of its probable retention under limited control for housing applications, may also be included.

► Despite their higher cost, the Norwegian government, for reasons of internal economy is pushing use of aluminum cans. The sardine pack will be put up entirely in aluminum cans and aluminum is expected to account for 50 pct of all cans used there.

► With profits taxes payable quarterly superimposed on big payrolls and large investments in inventory and retooling, it is predicted that automobile companies will be hard pressed to maintain satisfactory cash positions this year.

► Certain Balkan industrialists are seeking American capital to rebuild their heavy industries. While there has been some indication of Soviet interest in this financing it is believed that one prime objective of many attempts to secure American investment is to prevent the Russians from nationalizing the industries concerned.

How to Use Carbide Cutters for Milling

Industry's increasing use of cemented carbides for milling operations has made it desirable to provide tool engineers, setup men, process engineers and plant management with a single correlated source of the latest information on the application of carbide milling to present day production problems. To fill this need THE IRON AGE is presenting an extensive series of articles on carbide milling written by a foremost authority on the subject. These articles will give details, supported by practical shop examples, on how to machine practically all types of engineering materials, giving suggestions on the best setting up procedures and recommending the most efficient speeds and feeds. In this, the first article of the series, the general concept of carbide milling is discussed, with special emphasis placed on cutter angles and power requirements.

ALTHOUGH tungsten carbide was introduced commercially to American industry in the late twenties, more than a decade elapsed before this relatively new product of powder metallurgy could be applied to the milling of steel. The original development of tungsten carbide was successfully used for the machining, with both single point and multi-tooth cutters, of cast iron. But it was not until these original sintered carbides were considerably modified and refined that they could be used for the single point machining of steel and its alloys. And it was not until recently, scarcely more than 6 or 7 years ago, that tungsten titanium carbide was made available for the successful milling of steel and its alloys, particularly in the heat-treated state.

The successful, and even spectacular, results achieved with carbides in the milling of steel are due however not only to the availability of a stronger carbide more suited to these harder engineering materials, but also to the development of a radically different cutting technique. Both are necessary to the final results, the milling of steel at relatively high surface and feed rates. Straight tungsten carbide, or a sintered combination of powdered carbon and tungsten, does not possess the requirements for the successful milling of steel. On the one hand it is not sufficiently strong to withstand the high cutting pressures encountered when removing steel in the form of thick strong chips; on the other it has a much greater resistance to abrasion than is necessary for steel milling, and, conversely, is not sufficiently slippery to permit the quick and effective disposal of the hot steel chips. This series of articles is not concerned with the detailed discussion of the various specifications of carbides as cutting materials. It is sufficient here to refer briefly at the outset to the definite and unmistakable difference between the tungsten carbides used for the machining of cast iron and the nonferrous materials, and the radically different tungsten titanium carbides developed solely for the machining of the harder and tougher ferrous, or iron and carbon combinations.

The technique of using a grade of carbide suitable for the machining, particularly the milling, of steel, revolves around the use of suitable cutting angles that provide sufficient protection to the cutting edge of the carbide, and also to the proper design of the cutter body to result in efficient metal removal.

All of these aspects will be considered in the course of this series. For the present it is sufficient to state that the first successful application of a modified technique suited to the milling of steel was reported in 1939. World War II with its astronomical demands for armaments, largely of steel, increased the urgency for the development and subsequent availability of this technique.

The milling method to be discussed is a combination of a suitable carbide for the milling of steel and a technique that has proven successful in this field. The steel cutting grades of carbide contain varying amounts of tungsten titanium carbide and tungsten carbide. Varying the quantities of the former makes possible changes in the specifications to properly select a suitable grade. Carbide grade selection for milling operations will be discussed later in terms of actual shop operations.

The technique, or the other half of this method, can be effectively discussed in terms of the illustration of the mills shown in fig. 1. The use of solid carbide blades mechanically held is the outstanding feature of this technique and represents, by and large, a radical departure in cutter design. The blades of solid carbide are held by means of wedges properly seated and held in place by Allen head screws. The cutter body in this design becomes a precision tool holder, since each of the cutting blades is treated in a manner similar to a single point tool. This is true at least so far as the grinding and setting of blades in the cutter body is concerned. Close tolerances in the essential dimensions of slot, wedge and blade must be maintained. The steel body, heat treated, is sufficiently

By H. A. FROMMELT
Consulting Engineer, Chicago

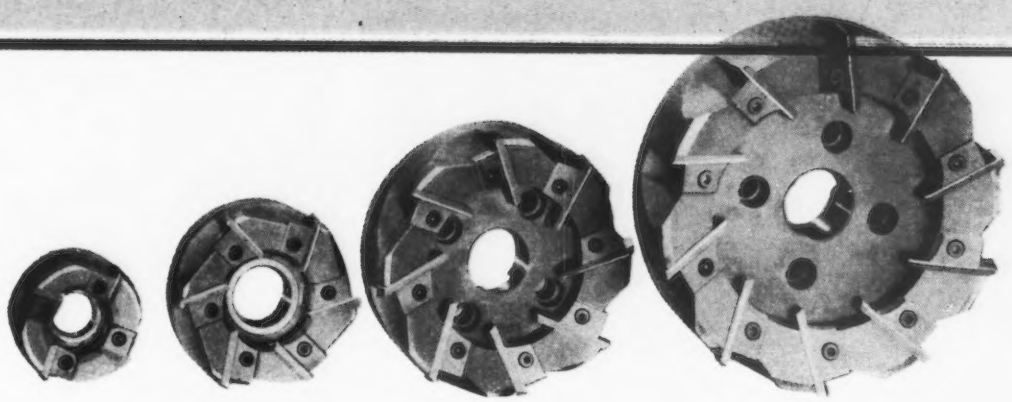


FIG. 1 — Typical face milling cutters with solid carbide blades mechanically held by means of set screws and accurately machined wedges.

rugged to withstand heavy cutting pressures encountered when removing heat-treated alloy steels. The fewer cutting blades in this design also distinguish it from the traditional cutter. The reasons for these design features, both mechanical and operational, will be discussed in the light of milling various grades of steel from low carbon (wrought iron) through the high carbon, to the more commonly used alloy steels.

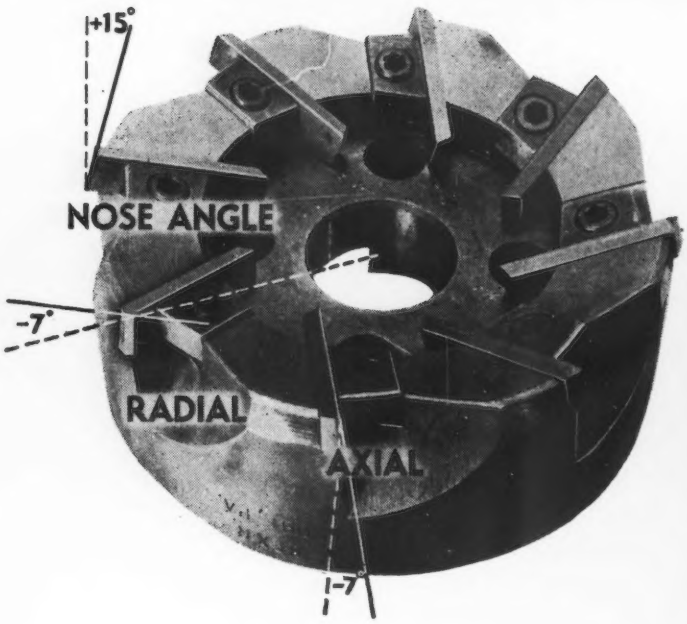
Fig. 2 presents the more commonly used cutting angles for the milling of steel. The angle at which the blade is set in the body in relation to the radius is 15°, which is standard for all cutters regardless of their application. The angle which the cutting edge, or that portion of the solid carbide blade that comes in contact with the workpiece, makes with the radius is referred to as the radial rake angle. For steel a 7° negative angle is used. This radical departure in the radial rake angle distinguishes the milling of the harder materials, particularly steel, from the others such as cast iron and the softer nonferrous materials. The axial rake angle, or that made by the blade with the axis, is also a 7° negative angle. This angle, as is obvious, is also the wedging angle, and hence the wedge design conforms to this specification. The corner angle of 15° is standard practice and is modified only when a specification calls for milling to a shoulder of specific angle.

The radial rake cutting angle can be quickly and easily modified when a blade angle of 15° is used, as it is in this design.

With a negative radial rake angle, in combination with the proper axial and corner angles, the carbide blade is given sufficient protection at the cutting edge. The included angle at this critical portion of the blade is greater than 90°. The cutting forces act against this cutting face or K-land of the blade in a direction approximately as shown in fig. 3. It will be noted that these forces tend to compress the carbide for which this sintered material is best suited. If, however, these cutting forces, so prominent in the milling particularly of the harder steels, place the carbide blade at this point in tension, these hard cutting metals would quickly break down. If the blade angle of 15° were also used as the cutting angle, the pressures in steel milling would be sufficiently great to break the carbide blade at the cutting edge when it was thus stressed in tension, as it would be with a 15° positive angle. But for the correct technique of steel milling this 15° positive blade angle is quickly and easily modified to present an obtuse angle to the workpiece, thus protecting the cutting material. Moreover, in this design, this cutting angle (the radial rake angle) can obviously be varied from 15° positive to any reasonable negative angle. Experience indicates that this radial rake angle is not, however, critical and that, except in unusual instances, its variation from 5° negative to 10° negative does not appreciably affect the final results. A typical steel milling operation on this class of work employs a 7° negative radial rake angle in combination with the 7° axial angle and the 15° corner angle. This can be considered as representing good average practice that need not be modified except in unusual instances.

In fig. 4 an SAE 4340 steel, heat treated to approximately 400 Bhn, is being successfully milled by a combination of a steel cutting grade of carbide and a 15° negative cutting angle. This modification was necessary because of the nature of the slotting operation and the high tensile strength of the component. Such modifications of the technique will be discussed with reference to every day practice in the course of this series. The vast majority of steel milling jobs, however, will probably fall in the classification calling for a negative radial rake angle in the neighborhood of 7°.

It should be noted that no one of the three angles, the radial, axial, and corner angle, in and by itself, determines the ability of the carbide to withstand cutting pressure. It is the combination of the three, and therefore the angle included between the cutting face, the side, and the edge of the blade that determines the lasting qualities of the cutting edge. This is frequently referred to as the resultant or the true

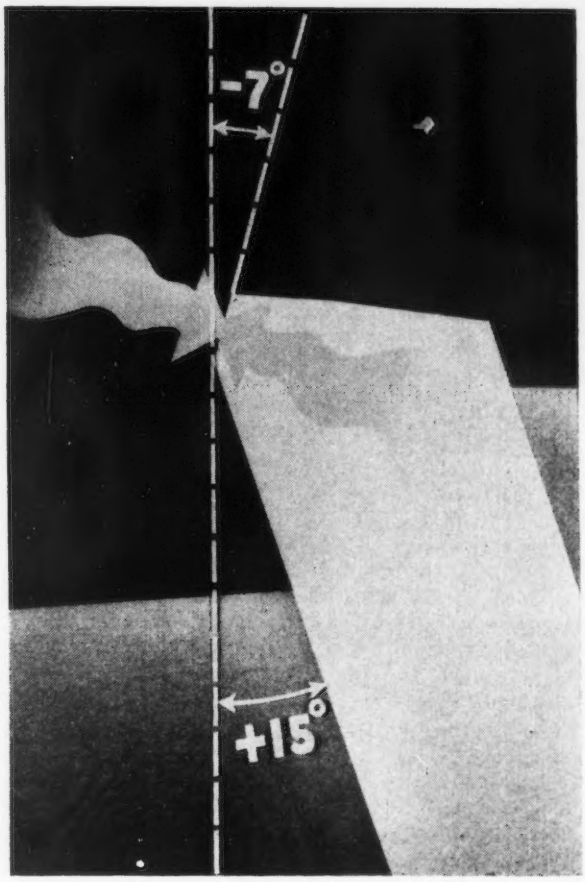


LEFT

FIG. 2—Detail of a milling cutter with inserted carbide blades, showing the cutting angles most commonly used for cutting steel.

BELOW

FIG. 3—Arrow indicates the direction of the cutting forces, showing that by the use of a negative radial rake angle these forces tend to place the carbide in compression, thus assuring maximum strength.



rake angle but need not be of further concern in this article. For mechanical reasons a 7° wedging angle was used, and this in turn is also identified with the cutting angle along the axis. Hence this is uniform for all cutters, and the 7° axial angle is employed for all milling operations regardless of the nature of the workpiece. This discussion will also concern itself largely with the use of a 7° negative radial rake angle as shown in fig. 2 for the milling of steel.

The so-called clearance angles are frequently of far more importance in the proper execution and application of this technique than the cutting angles. The difference between success and failure in the milling of the more difficult steels lies generally in the use of proper clearance angles. Fig. 5 illustrates the nature of these angles and their location. The clearance angle on the circumference, more commonly referred to as the peripheral clearance, is shown and the face clearance angle is also clearly evident in this illustration. The size of these clearances is all important in a good steel milling carbide operation and must be varied for the various types of steels. Because of these necessary variations and modifications, as well as the importance of this phase of the blade and cutter design, clearance angles will be frequently and specifically referred to in terms of actual jobs.

It is sufficient at this point to summarize the design details referred to previously. For the milling of steel, using solid carbide blades mechanically held as shown in fig. 1, the cutting angles presented in fig. 2 may be considered as standard. Of these only the corner angle is changed to suit workpiece specifications, and occasionally, when milling unusual steels, the radial rake angle is varied from the usually standard 7° negative. While the clearance angles used for steel are generally 7° on the OD and 7° on the face, these, and particularly the latter, may and should be varied as will be discussed in detail subsequently.

Perhaps the first and therefore the most striking characteristic of the milling of steel with carbide is the use of relatively high surface foot rates. While, until a few years ago, steel was milled at surface foot rates not to exceed 100 it is necessary to use rates varying from 300 to 1000, with the average somewhere around 500. Variations in surface foot rates will depend largely upon the hardness of the steel, though other characteristics of the workpiece may also influence the selection of the spindle speed or the surface root rate.

Table 1 presents, in summary, recommendations as to surface foot rates in relationship to hardness of materials in terms of rpm for various diameters of cutters, and gives a birdseye view of this outstanding characteristic of carbide steel milling. As the hardness of the workpiece increases, quite naturally the surface foot rate decreases. As the materials become softer, the surface foot rate increases, and for the very soft materials disproportionately so. That is, for some of the extremely soft materials such as wrought iron, which is being grouped with the steels, the surface foot rate sometimes necessarily jumps to 1000 fpm.

It is not only true to say that carbides can stand up under these increased surface foot rates, but it is also quite necessary to say that if the surface foot rate commonly selected for other cutting materials such as high speed steel were used, these sintered carbides such as tungsten titanium carbide

or the steel cutting grades would quickly break down. The friction or rubbing effect on the carbides at these low speeds becomes exaggerated, and since this type of carbide does not wear well under friction, it quickly breaks down. Thus the surface foot rate ranges shown in table 1 may even be considered a necessity.

A relatively heavy or thick chip, referred to as the chip load, or thickness per tooth, is also relatively high in carbide steel milling. Traditional milling practice using high speed steel employs chip loads of several thousandths, and only in unusual instances exceeds 0.005 in. Carbide steel milling prefers the heavier chip and the reason for this is presented in fig. 6. The thicker the chip the farther from the critical cutting edge are the cutting pressures applied. Moreover, the thicker the chip the fewer the number of chips that must be removed in a given length. This means fewer tooth contacts; in turn, therefore, less tooth wear due to friction. The usual or common practice in carbide steel milling prefers a chip load in the neighborhood of 0.010 in. This is varied downward only when there is an insufficient amount of power available. If, on the other hand, the horsepower is ample, the chip loads can be frequently increased to 0.020 in. and higher.

The modified cutting angle, referred to earlier, is also a significant characteristic of this technique. The customary positive angle, sometimes referred to as shear or hook angle, is replaced by the negative angle, as shown in figs. 2 and 3. This modification is necessary in conjunction with grades of carbide specially developed and suited for the higher cutting pressures encountered in the machining and the milling of steel.

The negative cutting angles are the logical result of the attempt to protect the critical cutting edge of the carbide blade. The negative cutting angles make it possible to present more than 90° of carbide to the workpiece at the cutting edge. This obtuse angle, as previously indicated, strengthens and reinforces the carbide blade at this point of contact. Above all, these negative angles make it possible to present the cutting forces to the carbide in a compressive rather than a tensile direction, and in compression, carbide is the strongest material known to science.

It is important at this point to emphasize the fourth outstanding characteristic of carbide steel milling, namely, the application of a steel cutting grade of carbide specifically suited for this technique. The nature and specification of these tungsten titanium carbides has been briefly referred to previously. It is important to stress an extremely important deduction from the application of these specially developed and prepared carbides for the milling of steel.

Steel cutting grades of carbide are totally different from those employed in the machining of cast iron and the other engineering materials including such nonferrous materials as aluminum, magnesium, and even the plastics. The essential differences include a wide difference in the hardness which involves a totally different grinding technique. Whereas the tungsten carbide grades of these sintered materials are successfully ground with silicon carbide wheels, the steel cutting or tungsten titanium carbides can be ground successfully only with diamonds. This is particularly true of the grinding operations involved in the milling technique. Variation from the use of diamond wheels will be referred to specifically in this series, as also will the details of the grinding techniques. Here it is sufficient to emphasize that this outstanding characteristic of carbide steel milling, the use of a steel cutting grade of carbide, involves an essential and very necessary difference in grinding technique.

Power Requirements

Since the chip loads and the surface foot rates are relatively higher in the milling of steel with carbide, the feed rates and, therefore, the horsepower increase. Since the rate of metal removal is stepped

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RIGHT

FIG. 4—Milling SAE 4340 steel heat treated to 400 Bhn. In this application a 15° negative cutting angle is employed because of the nature of the work and the strength of the material.

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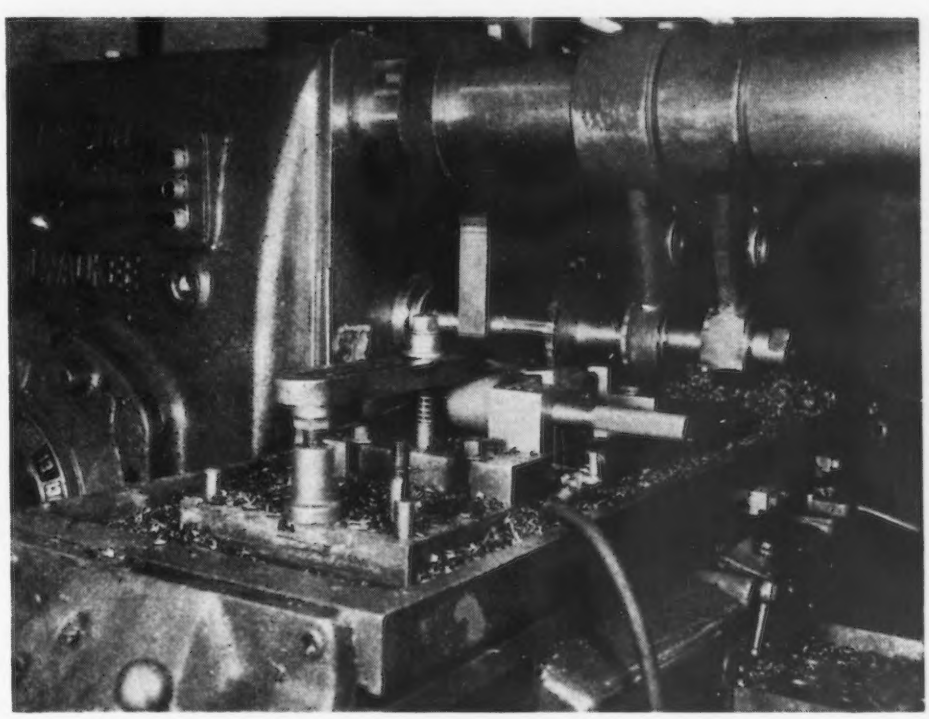

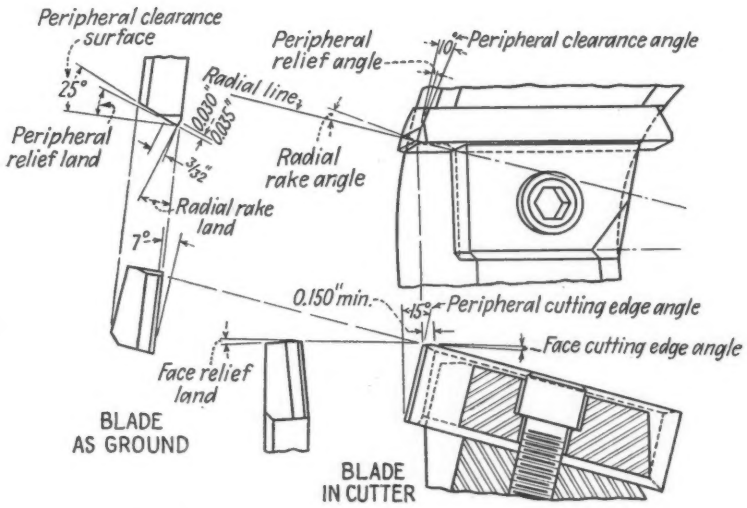

FIG. 5—Nature and location of the various clearance angles which are frequently of more importance for successful milling than the cutting angles.

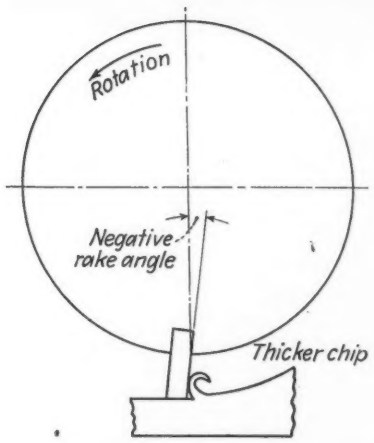

FIG. 6—In carbide milling, a heavy chip is a decided advantage, since, as shown here, it places the cutting pressure further away from the critical cutting edge.

up in proportion to the increase in the feed rate, the amount of power required increases proportionately. This must not be confused with cutting pressures, however. These, generally speaking, are less with carbide than with any other cutting materials. But since the feed rate, or the rate at which cubic inches of metal are removed, is increased four, five, and even more times with the use of carbide, the horsepower input to the spindle is increased.

This does not mean that all carbide steel milling requires a milling machine of large horsepower. Milling operations are being successfully performed on standard equipment having 1 hp or less available at the spindle. But whereas only a small portion of this power was formerly used with high speed steel as a cutting material, all of it can now be used with a carbide blade. Table II presents a list of the K-factors, or the horsepower required to move 1 cu in. of steel per min. These K-factors are considerably less for carbide as compared with other cutting materials. Thus, many standard everyday carbon steels can be milled by using ½ hp for each cu in. per min. The same steel milled with high speed steel cutters would require from 1 to 2 hp per cu in. per min. Thus, for every horsepower available in a milling machine, twice as much metal can be removed with carbide cutters as compared with those of traditional design and employing standard cutting materials. The importance of this extremely important characteristic of carbide steel milling can be appreciated only in terms of the increase in production rates made possible with carbide steel milling, and presented in terms of actual operations.

Machine tools designed specifically for carbide, especially milling, are being made available with flywheels as a part of the standard design. While such equipment is not a necessity, it does make for

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FIG. 8—Setup for grinding cutting angles on carbide blades.

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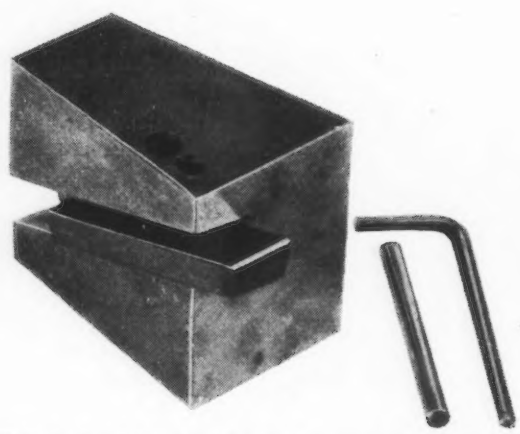


FIG. 7—Special tool holding jig for accurately grinding the cutting angles on carbide blades.

TABLE I

Recommended Cutter Speeds for Various Hardnesses

HARDNESS OF STEEL			SUGGESTED RPM FOR MILLING			
Rockwell C	Brinell	Scleroscope	3-in.	4-in.	5-in.	6-in.
51	495	69	105–150	80–120	65–100	55– 85
45	427	62	125–170	95–130	75–110	65– 95
40	370	54	160–230	120–170	95–140	80–115
35	323	46	220–320	165–240	135–200	110–165
30	276	42	320–450	240–350	190–280	160–230
25	249	38	440–640	330–430	270–390	220–320

Courtesy Kennametal, Inc.

TABLE II

K Factors for Different Materials

Material	Aluminum			Bronze			Cast Iron			Meehanite			Malleable Iron	Steel						
																	Alloys			
	Soft		High Silicon Alloys	Soft	Medium	Hard	Soft	Medium	Hard	Soft	Medium	Hard		SAE 1112	SAE 1020—1335	SAE 1045 as cast or forged	Up to 200 Bhn	200—250 Bhn	250—300 Bhn	300—360 Bhn
K	0.1	0.2		0.3	0.4	0.5	0.3	0.4	0.5	0.35	0.45	0.55	0.5	0.6	0.6	0.6	0.7	0.8	1.5	1.75

Courtesy Kennametal, Inc.

a smooth flow of power to the spindle. This in turn affects carbide life and hence should be given consideration. This is true even of standard equipment on which flywheels can be mounted as an accessory.

All carbide milling, including the milling of steel, is effected without the use of coolant. It is characteristic of this technique of milling that the heat appears largely in the chips rather than the tool and the workpiece. The heat conductivity of carbide is extremely low as compared with steel, and since the rate of metal removal is high, the heat of work is confined largely to the chip. The advantages of this characteristic are numerous and deserve specific consideration in terms of everyday shop operations, as will be discussed later.

The grades of carbide used in the milling of steel, as one of the outstanding characteristics of this technique, lead to an important difference in the grinding, as previously noted. In fact, this is the most important deduction to be made concerning the use of special carbides for steel. Hence this factor is emphasized by considering it as a special characteristic of carbide steel milling. Figs. 7 and 8 show the jig and setups used for the grinding of the steel cutting grades of carbide blades used in milling.

The use of diamond wheels should be considered a necessity. The reasons for this and the details of the grinding operations will be considered in detail in its proper place.

During the past decade or more, steel's position in the engineering world as twentieth century's most important industrial and manufacturing material was jeopardized by development of numerous nonferrous materials, including plastics. How successfully steel will meet these invasions depends upon a great number of factors. But one of its most successful weapons, made available during the past few years, is its tremendously increased machinability from the application of carbide. This is particularly and outstandingly true of the milling of steel, where the rates of machining have increased as much as 10 to 15 times. Moreover, materials that only recently were considered as unmachinable are now being processed at rates considerably above those used for straight carbon steels prior to the application of carbide.

Part II of this series of articles will appear in the next issue. —Ed.

Molybdenum Steel Riveting

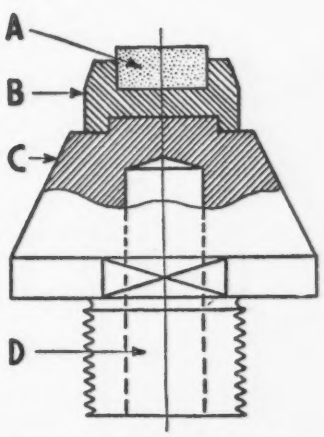
THE setting of molybdenum steel rivets by means of an electrical riveting machine involves very severe service for the riveting tips. To simplify this problem an employee of the staff of the Metropolitan-Vickers Electrical Co., Ltd., England, suggested a solution which has been further developed at the company's works.

The resulting device has been used successfully in the assembly of turbine blading for the riveting of the blades to diaphragms. The electrical riveting machines used for this purpose were originally fitted with plain tips of tungsten-copper, which were quite satisfactory when used on mild steel rivets.

For molybdenum steel rivets, however, a much higher pressure is required, and for this service tungsten-copper tips were not very effective and their life was short.

As a first alternative riveting tips were used made of an extremely hard sintered tungsten carbide material. For the riveting of molybdenum steel, however, this tungsten carbide material was found liable to cracking under the severe hammering, and the life of the tips was only 1 to 100 operations.

The difficulty was overcome by shrouding the tungsten-carbide tip in a molybdenum steel cup, as shown in the accompanying sketch. A trial with this arrangement gave a run of 700 operations with comparatively few signs of cracking.



SECTIONAL drawing of tungsten carbide tip arrangement for setting molybdenum steel rivets.

Brazing is employed for fixing the tip in the cup and also for attaching the cup to the electrode body. The molybdenum steel rivets used in the work described range from 0.340 to 0.405 in. diam.

Metallurgical Applications

By JOHN L. ABBOTT*
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FIG. 1—Complete X-ray diffraction spectrometer and recorder unit. The X-ray tube is inside the two domes at the left. The specimen holder is indicated by the left-hand arrow; the scaling unit meters are indicated by the right-hand arrow; the strip-chart unit is at the right; and the Debye camera mounting is at the extreme left.

THE Geiger counter X-ray diffraction spectrometer coupled with the Brown ElectroniK strip-chart recorder, as developed by the North American Philips Co., provides a means of X-ray diffraction analysis which is practicable for inspection and materials analysis on a production basis, in addition to its employment as a research instrument. The use of the recording spectrometer eliminates to a great extent the errors and inaccuracies inherent with the usual photographic recording equipment, and also greatly decreases the time required for analysis and interpretation of the recorded data. The simplicity of operation of the equipment enables an intelligent technician to produce results which previously required the services of a highly trained specialist.

The X-ray diffraction spectrometer furnishes a new and versatile means of determining metallurgical structures, phase changes and distribution, and grain size, and provides a means of analysis which definitely identifies the constituents of materials as actual crystalline compounds or minerals, rather than as elements as do spectrographic and chemical analyses. The equipment promises value as a positive nondestructive inspection instrument for determining the physical properties, heat treatments, and surface conditions of finished and semifinished parts. As an analytical instrument used in coordination with metallographic, chemical, and spectrographic analysis, X-ray diffraction offers a new means of determining the basic structures of materials. The range of use is wide, including analysis of; (1) metals and alloys in all phases of manufacture and heat treatments, (2) phase and structural changes occurring during fabrication and operation of high temperature and heat resistant alloys, (3) solution and aging treatments of nonferrous alloys, (4) nonmetallic materials, and (5) chemical compounds and minerals such as salts and fluxes for heat treating, brazing, and welding, welding rod coatings, paints and surface coatings, ceramics and heat resistant materials, etc.

The development of the electronic strip-chart recorder coupled with the X-ray diffraction spectrometer produces a readily understandable graph of the line intensities and angular position of the lines in the X-ray diffraction spectra pattern and provides an easily interpreted permanent record of the analysis. Usually the diffraction pattern may be scanned manually to locate the most intense lines by observing the deflection of the microammeter, then recording the pattern over a few degrees, thus resulting in a considerable saving in time. The entire quadrant of the pattern may be recorded in 90 min (1° per min). Interpretation of the recorded chart consists of the determination of the wave lengths of the diffracted lines by the use of tables which show the wave length in Angstrom units v. the diffraction angle. The wave length for all practical purposes is identical with the interatomic distances of the material, which may be identified by the use of an index of characteristic X-ray diffraction spectra such as the ASTM Index.

The X-ray diffraction spectrometer as developed by the North American Philips Co. consists of four units; (1) the X-ray generator, (2) the Geiger counter spectrometer (goniometer or analyzer unit), (3) the meter and scaling unit, and (4) the Brown ElectroniK strip-chart recorder, see fig. 1.

The conventional X-ray diffraction apparatus as previously developed utilizes special types of photographic equipment (such as the Debye-Scheerer camera, the back and front reflection camera, etc.) for recording the X-ray diffraction pattern instead of the Geiger tube spectrometer and the coupled electronic recorder. Camera type equipment is limited by the inherent shortcomings of photographic film, including long exposure time, inconsistencies in exposure characteristics, development variables, film shrinkage errors, low magnification, and the inaccuracies of visual or densitometer interpretation. While the camera type equipment usually records the entire diffraction pattern on photographic plates or films

* *Mr. Abbott, the author, is now application engineer, industrial X-ray division, North American Philips Co., New York.*

of the X-Ray Diffraction Spectrometer

The wide range of industrial application of the Geiger counter X-ray diffraction spectrometer is indicated in this article, wherein the author outlines use of the equipment in producing X-ray diffraction patterns (1), of several basic steel structures, (2) illustrating the effect of heat treatment on steel and on an aluminum alloy, (3) illustrating the effect of cold working steel, and (4) demonstrating versatility in performing chemical analyses. In this, the first part of a three-part article, the author introduces various aspects relating to the operation of the equipment and presents diffraction curves which indicate the effects of apparatus variables on diffraction patterns.

approximately 6 x 8 in. in size, as are used on the front and back reflection camera, or on strip film approximately 2 x 16 in. as used on the Debye type camera, the strip-chart record can be produced in lengths up to 180 in. with a width of 10 in. The usual length is 1 in. per degree of diffraction and covers accurately the range from about 3° to 90°.

The use of the Geiger tube spectrometer provides a versatile means of recording the diffraction pattern. The entire pattern or any portion of the pattern may be recorded on the strip-chart. By manual operation of the spectrometer, the exact position of the individual lines may be determined to 0.03° by means of a vernier on the analyzer arm of the spectrometer. The intensities of the lines may be accurately determined by means of the microammeter of the scaling and counting unit, or the actual number of discharges of the Geiger tube may be counted by the electromechanical counting unit for predetermined time intervals. Thus the entire pattern may be studied, and each individual line may be very carefully analyzed with far greater accuracy than has been possible with camera type equipment.

The convenience and simplicity of this equipment make operation possible without the necessity of a highly trained specialist. The actual manual operation of specimen preparation, the recording of the diffraction pattern on the strip-chart recorder, and the identification of the major lines are well within the capacity of an intelligent technician.

For diffraction study beyond the range of the spectrometer below about 3°, the use of low angle scatter camera equipment is required. For angles above 90°, the usual type equipment, front and back reflection and the Debye-Scheerer cameras are necessary. However, the spectrometer is equipped to permit the limited use of camera type equipment on the opposite side of the X-ray tube from the spectrometer. A two window X-ray tube is used for this purpose, permitting the use of the equipment for both types of analysis. This special equipment is used more in the field of advanced research rather than for practical work. However, the availability of camera-type equipment increases the versatility of the spectrometer.

The basic operation of the X-ray diffraction spectrometer is as follows: The X-ray beam is generated by an interchangeable air-cooled X-ray tube which is available with either iron, copper, molybdenum or tungsten targets, depending upon the requirements of the material being examined. The X-ray beam is defined by horizontal and vertical slits and directed

FIG. 2—Diffraction curve showing the effect of crystal orientation from cold working stainless steel. I=15, D=70.

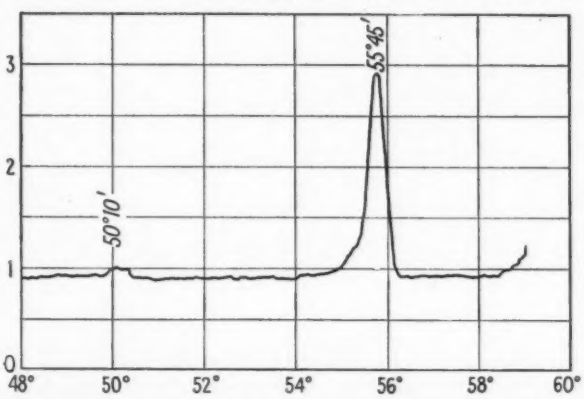
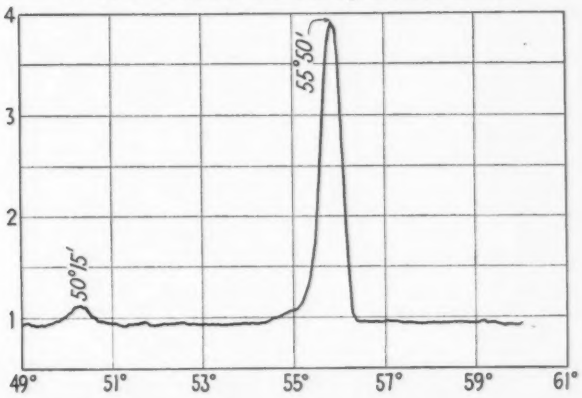


FIG. 3—Diffraction curve showing the effect of crystal orientation from cold working stainless steel. Specimen is rotated 90° from that shown in fig. 2. I=15, D=70.



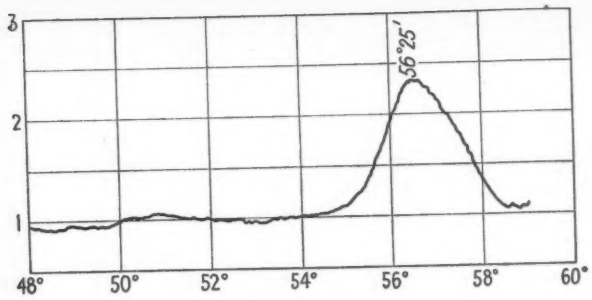
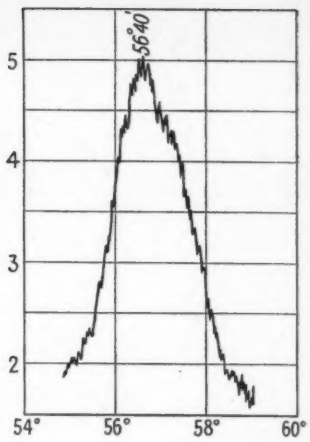


FIG. 4—Diffraction curve showing the effect of the recorder intensity control. Intensity control setting=15, damping control setting=50.

RIGHT

FIG. 5—Diffraction curve showing the effect of the intensity and damping controls. Intensity control setting=35, damping control setting=50. Note that intensity is higher than that shown in fig. 4.



upon the specimen which is mounted in a suitable holder. The X-radiation consists initially of Kα and Kβ radiation as it leaves the X-ray tube, but the objectionable Kβ radiation is filtered out of the beam by passing it through suitable filters mounted on the slit supports, thus producing an essentially monochromatic radiation. The filtered X-ray beam is diffracted (or reflected) from the atomic planes of the specimen in a pattern of lines (the X-ray diffraction spectra) at characteristic angles according to the Bragg theory. The intensities of the diffracted radiation lines are determined by the Geiger counter spectrometer unit and are indicated by the microammeter on the scaling unit. The actual number of impulses received from the discharging of the Geiger tube on the analyzer arm may be counted by the counting unit for various time intervals. A continuous record of the radiation intensity picked up by the Geiger tube as the analyzer arm scans the quadrant may be recorded on the strip-chart, thus providing a complete curve showing the intensity of the diffraction pattern lines v. the diffraction angle.

The analyzer, or goniometer, contains the Geiger tube, which is rotated over the quadrant by means of a 1-rpm synchronous motor drive mounted on the vernier head. By means of a suitable gearing system, the specimen holder is also rotated, but at one half the speed of the analyzer arm, so that the angle between the specimen and the primary X-ray beam (θ) is always one half the angle between the Geiger tube and the X-ray beam (2θ). The normal scanning rate of the analyzer arm is 1° per min. Other synchronous motor drives are available with speeds of ¼, ½, and 2 rpm which provide scanning speeds of ¼°, ½° and 2° per min, respectively. The chart feed on the strip-chart recorder is also driven by means of a synchronous motor at a speed of 1 ipm. Thus with the 1-rpm analyzer drive motor, the Bragg angle (2θ) as recorded on the strip-chart is 1° per in., with speeds of ¼°, ½° and 2° per in. when the other analyzer drive motors are used.

The X-ray diffraction pattern usually consists of a series of lines somewhat similar to a spectrographic spectrum pattern. The atomic plane spacings which can be detected range from 1 to 80 A using wavelengths of X-radiation range from approximately 0.7 to 100 A units, depending on the target material. The spectrographic spectrum ranges from 1850 to 8000 A. The angular position and the intensity of the diffracted lines are constant and characteristic for a given material since they are dependent upon the diffraction of the essentially monochromatic X-ray beam from the crystallographic planes of the spectrum. The diffraction angles and the line intensities are changed only by variation in the crystalline structure of the material. The diffraction angle is not changed by any operating characteristics of the spectrometer, which is initially calibrated using a known standard characteristic radiation such as that of quartz or tungsten. The intensity of a characteristic radiation at a given angle is constant for each specimen, but is influenced by crystalline orientation such as that introduced by cold rolling or directional working. Since the X-ray diffraction spectrometer analyzes only a section through one half of the cone of radiation which is recorded by the front and back reflection type equipment, the position of the specimen with relation to the X-ray beam determines the section which will be scanned by the spectrometer. This is one fault of the present type spectrometer, but a rotating specimen holder is being developed which will permit determination of the maximum and minimum areas of radiation produced by the differential orientation of the individual crystals or gains of the specimen. The effect upon the X-ray diffraction pattern as caused by crystal orientation produced by cold rolling is shown by the variation between two patterns made on a specimen of cold-rolled stainless steel. The specimen was rotated 90° between the two recordings (see figs. 2 and 3).

The strip-chart recorder is coupled with the Geiger counter spectrometer so that as the analyzer scans the quadrant, the intensity of the radiation is recorded continuously. The peak lines on the recorded curve locate the positions of the lines in the diffraction pattern. The recorder is provided with an intensity control and a damping control. The intensity control regulates the horizontal component of the recorded diffraction curve, making possible adjustments to provide a maximum of contrast between the peak line intensities and the background radiation, and also permits adjustment of the overall width of the curve so that the peak lines will fall within the limits of the recorder chart. The effect of variations in the intensity control is shown in figs. 4 and 5, which show the same radiation pattern recorded at low and high intensity settings of the recorder respectively. The damping control regulates the rapid fluctuation of the recorder mechanism caused by the discharging of the Geiger tube, and so regulates the width and regularity of the inked

line on the chart. High damping tends to average the pulsation and produces a relatively smooth line.

For a more technical discussion of the X-ray diffraction spectrometer and an explanation of the theories of X-ray diffraction, the reader is referred to the technical literature (see Bibliography). Suffice it to say that X-rays are diffracted characteristically by individual compounds, and that the X-ray diffraction spectrometer coupled with the electronic strip-chart recorder provides an easily operated and relatively simple means of recording the X-ray diffraction pattern for utilization as a means of analysis. It should be noted that X-ray diffraction provides compound analysis (analysis of the crystalline components) and not an analysis of the individual elements, as is obtained by chemical and spectrographic methods. Qualitative X-ray diffraction analyses are relatively simple, consisting of the recording of the diffraction pattern and determination of the wavelength of the most intense lines. By the use of the ASTM Index, the compounds having these characteristic lines may be determined if they are listed. Quantitative analysis on a comparative basis is possible by the use of known standards and internal reference standards of stable materials such as quartz or tungsten. Analysis is based on the relative intensities of the most prominent lines of the standards and the unknowns using the internal reference standards to provide a base compensating for mechanical variations.

Procedure

The purpose of this investigation was to determine some of the metallurgical applications of the X-ray diffraction spectrometer by recording the characteristic X-ray diffraction spectra patterns produced by varying heat treatments of a number of typical steel and aluminum specimens. For comparative purposes, the metallurgical and chemical properties of these specimens were also determined. A demonstration of the equipment for compound analysis was provided by analyzing samples of brazing flux and welding rod coatings. The steel and aluminum specimens for this investigation consisted of typical metallurgical specimens—small sections approximately 1 in. in diam and ⅛ in. in thickness. One face of the specimens was prepared metallographically by grinding and finishing on abrasive papers and then electrolytically polishing to remove the worked surfaces. These were placed in the specimen holder of the spectrometer unit, intersecting the X-ray beam. The most intense areas of diffracted radiation were then located by manually scanning the quadrant with the Geiger counter analyzer arm and noting the maximum deflections of the microammeter. Then an angle of approximately 12° to 15° covering this area was automatically scanned and the diffraction curve was recorded on the strip-chart.

The metallographic structures of the same surfaces were photomicrographed for coordination with the X-ray diffraction pattern. The chemical analyses of the materials (except for carbon) were determined spectrographically. The hardness of the various specimens was determined to indicate the respective physical properties. The brazing flux samples and the welding rod coatings were prepared by mounting the powdered samples on microscopic slides by means of a suitable adhesive. The strip-chart records produced by the spectrometer and recorder were examined on a comparative basis and the results coordinated with the physical and metallographic data. The records produced by the brazing flux and the welding rod coatings were analyzed for the principal components by determining the Bragg plane spacing (crystallographic plane spacing) according to the Bragg equation:

$$d = \frac{n\lambda}{2 \sin \theta}$$

where d is the interplanar spacing (Angstrom units), also the wavelength of the characteristic X-ray diffraction spectrum line,
n is an integer (usually one),
λ is the wavelength of the X-ray tube target radiation (Angstrom units), and
θ is the Bragg angle (angle of diffraction).

The radiation from the X-ray tube consists of the characteristic wavelengths produced by the displacement of the K-series electrons of the target material atoms. This radiation consists of three or more wavelengths as follows:

Radiation	Copper Target, A	Iron Target, A
$K\alpha_1$	1.5374	1.9321
$K\alpha_2$	1.5412	1.9360
$K\beta_1$	1.3894	1.7530
$K\beta_2$	1.3782	.....

The relative intensities of these radiations are:

Radiation	Copper	Iron
$K\alpha_1$	1.000	1.000
$K\alpha_2$	0.460	0.491
$K\beta$	0.158	0.182

The $K\beta$ radiation is filtered out of the copper radiation by means of a nickel foil filter. A manganese filter is used for filtering the iron radiation. By this method the X-radiation, for all practical purposes, consists of only the $K\alpha$ doublet.

Substituting the average wavelengths of the $K\alpha$ doublet in the Bragg formula, the equation becomes approximately:

$$\text{For copper, } d = \frac{0.77}{\sin \theta}$$

$$\text{For iron, } \quad d = \frac{0.97}{\sin \theta}$$

Tables are available showing the d values for all values of θ for each target material. By use of an index of characteristic X-ray diffraction spectra such as the ASTM Index ("Data Cards for the Identification of Crystalline Materials by the Hanawalt X-Ray Diffraction Method") the d values for the various lines on the curve can be identified as characteristic of the various compounds or minerals. Thus, it is a relatively easy matter to identify the principal components of mixtures of chemicals and minerals.

In a subsequent issue of THE IRON AGE *the author will present a study of the effects of heat treatment on the X-ray diffraction pattern of a steel and an aluminum alloy.—Ed.*

Mirror Bright Copper Plating

FIG. 1—Zinc base die castings with deep recesses shown here illustrate the throwing power of the bright copper bath described in this article.

• • •

The addition of a small proportion of a brightener solution, described in this article, to the conventional copper cyanide plating bath offers promise of lower plating costs by eliminating the need for buffing copper deposits and serves to cut down racking and handling time in the plating shop.

o o o

By JOHN ANTHONY
Eastern Regional Editor

o o o

A NEW process for the electro-deposition of mirror bright copper at high speed, and which promises to reduce the overall cost of plating, has been announced by MacDermid, Inc., Waterbury, Conn. This new bright copper plating process is based on the addition of 2 pct by volume of a brightener solution to the conventional cyanide plating bath containing 4 to 4½ oz copper per gal.

The plating cycle for copper and nickel commonly involves a copper bath, alkaline cleaner, acid dip, rinse, dry, buff, usually followed by bright nickel. The use of the new bright copper solution permits a simplification to three stages: Bright copper, rinse, bright nickel.

The MacDermid bright copper bath is said to deposit 0.0005 in. of copper in 15 min with a current density of 20 amp per sq ft at 1 to 2 v, with the bath held at 140° to 160°F. Some agitation is needed, either of the work or the solution. A hydrogen ion concentration of pH 13 to 13.5 is recommended. The bright copper bath is monovalent and it is said to have an efficiency of 100 pct. Figs. 1 and 3 show typical parts being given a bright copper plate.

One of the plating shops now using the MacDermid bright copper plating bath is the Globe Slicing Machine Co., Stamford, Conn. Charles Temple, plating shop superintendent, has reported significant savings in labor cost due to the reduced need for reracking and rehandling parts during copper and nickel plating. There is no need for reracking during the full copper-nickel-chromium plating cycle. Other savings are realized in shorter shop time, lowered raw materials costs and smaller tank investment.

The MacDermid bright copper bath is reported by Mr. Temple to plate bright in recesses and on sharp edges. Therefore, it should be possible to cut down on the overall weight of copper deposited without sacrificing corrosion protection at these points.

The use of the bright copper bath on zinc base die castings is particularly advantageous, according to Mr. Temple. In buffing dull copper applied to such parts, it often happens that insufficient copper remains at the high points to prevent attack on the base metal by the acid nickel bath. Then the zinc sweats out and leaves unsightly streaks on the finish plated surface. Since it is unnecessary to buff the bright copper deposit, there is no danger of this happening.

Platers using the bright copper bath will require

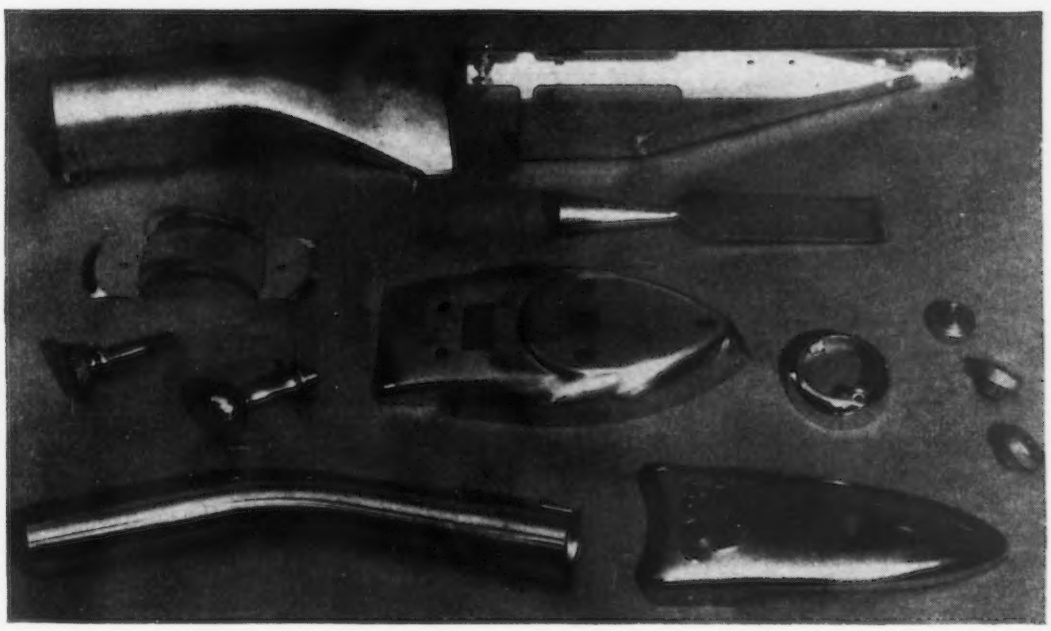
RIGHT

FIG. 2—Bright copper plating at Superior Plating Co., Bridgeport, Conn. This is a typical hand operated cathode rod agitated installation.

o o o

BELOW

FIG. 3—Typical parts given a bright copper plate. The buffed steel parts require no copper buffing. Polished steel and unpolished steel parts can be copper buffed to hide polishing marks or imperfections of the base metal. The parts shown here have not been plated.



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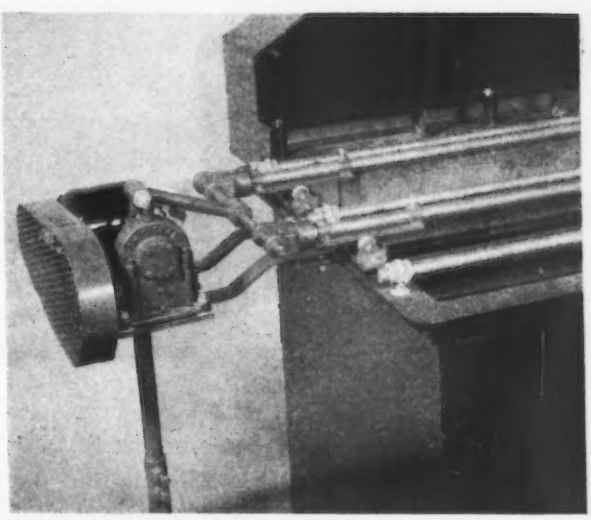
BELOW

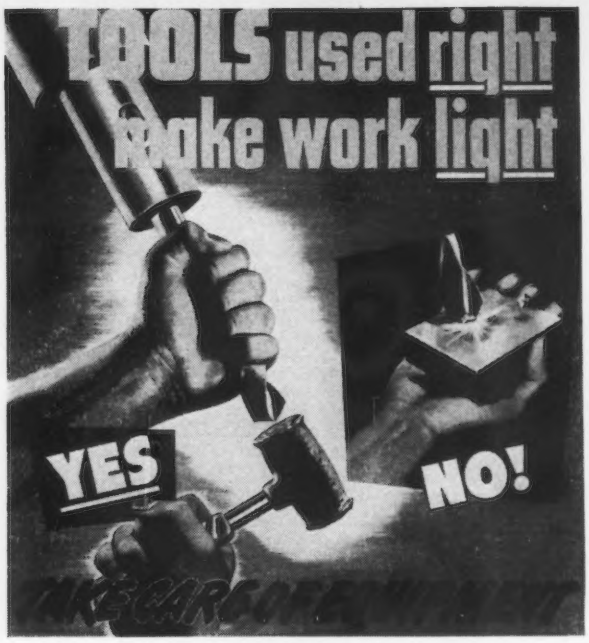
FIG. 4 — Type of agitation recommended for hand operated tanks. A cathode rod agitation of 20 ft per min gives best results.

o o o

a more carefully prepared base metal before plating because the minor surface irregularities which are usually buffed away after deposition of dull copper would be carried into the finished surface even after deposition of bright nickel and chromium. Fig. 3 shows a copper plating operation at Superior Plating Co., Bridgeport, Conn.

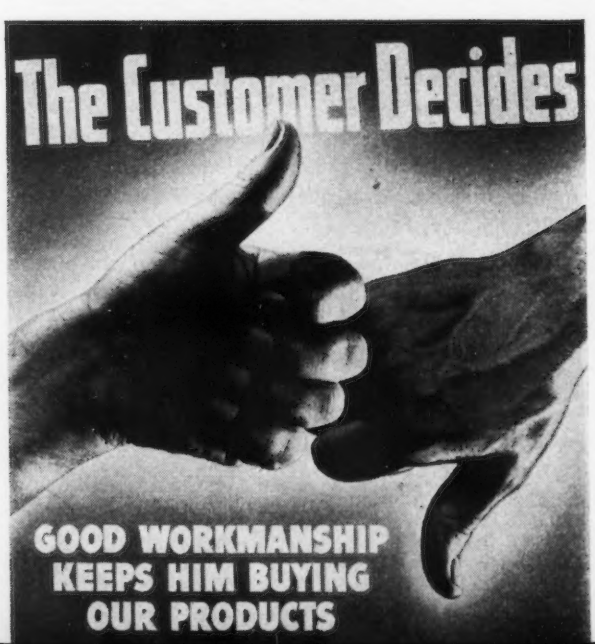
The preferred solution for the bright copper plating bath contains per gallon of solution, 6 oz copper cyanide, 9 oz potassium cyanide, 2 oz caustic potash, 6 pct by volume Rocheltex and 2 pct MacDermid bright copper makeup. Recommended agitation is cathode movement of 20 ft per min or more (see fig. 4) or solution agitation directed to the cathode. The anode area should be at least twice the cathode area. Any type of copper anode may be used.





GM Stresses Need for More Production, Less Waste

As part of a program to keep its employees better informed on various subjects, General Motors has prepared a new series of posters for plant posting. Some typical examples of this series are reproduced herewith. The posters follow three general themes. One is that high productivity benefits everyone. The second theme illustrates various GM employee benefits, while the third makes the point that everybody profits when business prospers. This latter group emphasizes the fact that owners of businesses receive only a few cents per dollar return on investments and that profits provide money for creating new jobs.



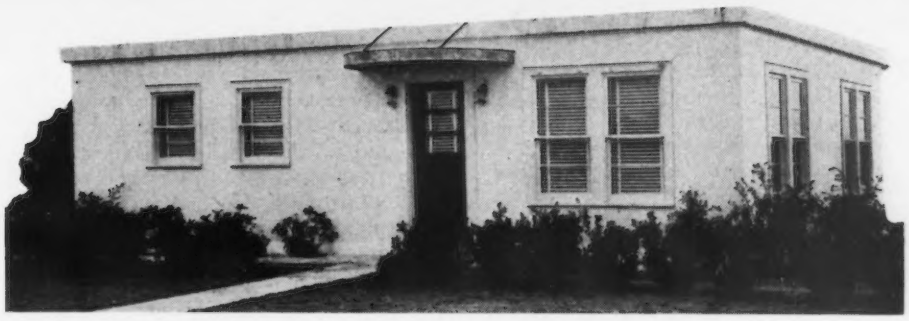


FIG. 1—Typical mass produced monolithic cast concrete house being turned out by LeTourneau by the mass production methods described in this article.

Use of Steel Forms for Concrete House Production

By WALTER J. BROOKING

Dean, LeTourneau Technical Institute, Longview, Tex.

Production of concrete houses in one piece on a mass production scale at the Longview, Tex., plant of LeTourneau, Inc., involves the use of some new and novel techniques. This article describes the weld fabrication of the steel house forms, the method of setting up the forms, the pouring of the monolithic structure, and some of the unusual prime movers that are used in the production process.

ONE of the major items of equipment which will be produced in the LeTourneau, Inc., plant at Longview, Tex., is the steel forms for the mass production of the 24 x 32 ft monolithic concrete house structure required for the home shown in fig. 1. The development of the process of casting a complete basic house structure including all four walls, a center partition, roof, and integrally cast base foundation structure was undertaken primarily to meet an employee housing problem at another of the LeTourneau company's manufacturing plants.

The underlying idea was to produce steel forms which could be used over and over again to produce in a simple repetitive operation a complete basic house structure, including foundation, walls, ceiling and roof. The basic structure of the houses, over 60 of which have already been completed in the large scale housing program at the LeTourneau plant in Longview, Tex., consists of 5-in. thick walls which flare at the bottom to a 12-in. base to form a permanent foundation; a center 5-in. thick partition which runs the full length of the house; and a roof 8 in. thick at the outer sides, sloping toward the middle to 5 in. in thickness, and leading to a side drain from the roof.

The necessary machinery for the production of these homes consists of the collapsible inside form in two parts to produce a partition the full length of the house, and the expansible outside form, both of which are shown in fig. 3. The expansible outside form in fig. 2 is shown in its unexpanded position and includes a house structure which is being removed from the inside form.

Serving with the inside and outside forms, the huge tractor prime mover attached to the two wheeled U shaped wagon, as shown in fig. 3, which straddles the form, hoists, and carries the outside form, either with or without a house structure in it is a necessary element of equipment. In addition, a portable crane for moving and handling the inside forms and a portable concrete mixing unit has been developed as accessory equipment for the building of these homes.

The basic material used in the production of the house structures, or shells, is Portland cement made into concrete using a special heat insulating cellular aggregate instead of gravel. This concrete is strongly reinforced with reinforcing steel, about 5000 ft of a combined $\frac{3}{8}$ and $\frac{3}{4}$-in. size being used in the 24 x 32 ft basic home structure. This produces a rapid setting, rigid, solid concrete and guarantees a permanent housing structure with a high degree of insulation from temperature changes.

With growing demand for the mass production of these house forms in sufficient quantities to meet the need, R. G. LeTourneau, Inc., undertook the construction of a new factory 310 x 1000 ft long at Longview, Tex. This factory is being devoted to manufacture of inside and outside house producing forms and other special machinery. The manufacture of the house

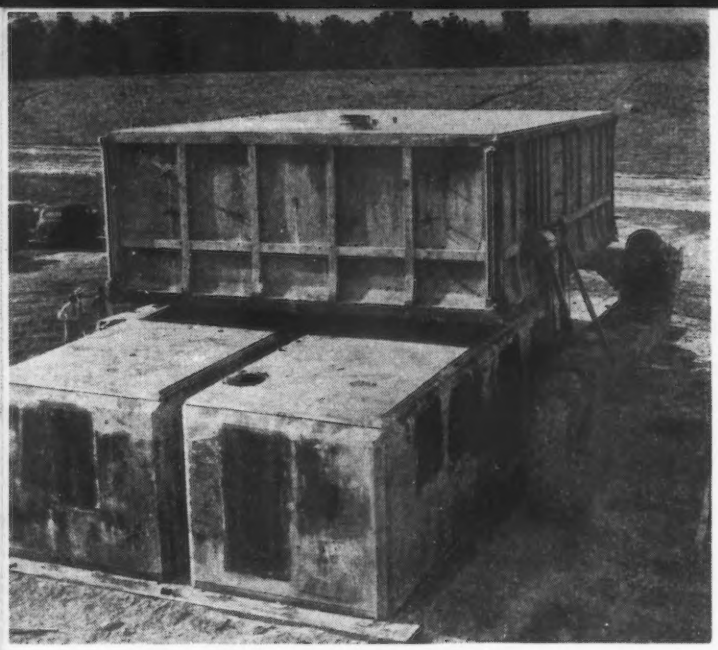


FIG. 2—Essential elements for the production of the house shown here are the inside form (split in two to provide a partition), the outside form and the prime mover.

Substructures and parts which serve as anchors for moving parts, or will be moving parts themselves, are premachined prior to being welded into the main structure. The advantages of this premachining are found in the smaller machine tools required and the more simple machining operation for smaller structures, and the fact that it would be impossible economically to machine such large structures as the completed house forms.

Both the inner form and the outer form structures are built of substructures which are fastened together by bolts, pins, or capscrews placed in the premachined parts of the structures. Standard setting up fixtures for all of these major structures have been built in order to insure ease of setting up and faithfulness of duplication of the structure.

The base structure for the inside form is produced on a single long combination setting up and weld positioning fixture shown in fig. 4. This is a spinner type fixture with a basic framework equipped with stops which locate the main parts of the base substructure without hand measuring on the part of the welder who sets up the structure.

In addition to stops which automatically and positively locate the parts, the fixture is equipped with clamps which fasten the part firmly in place and hold them solidly in the fixture. After the parts are set in the jig and tacked together, the welding is completed.

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FIG. 3—This prime mover forms an integral part of the house production procedure. The outer form is shown here expanded for removing from the house proper.

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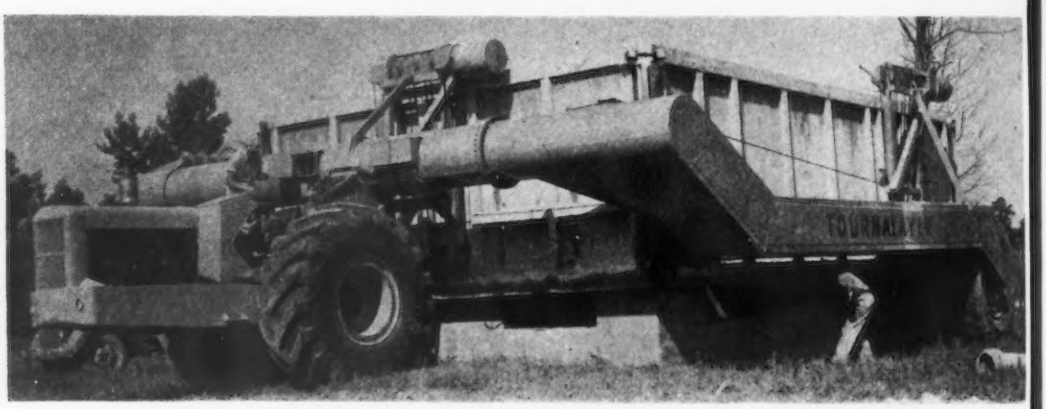

forms is typical of other LeTourneau manufacture, being of arcwelded steel construction and using standardized mass production methods.

A single production order for the house form units consists of the parts for several completed house forms. Jigs and fixtures have been produced which standardize the various structures and elements of the inside and the outside form so that each one of a certain model is an exact duplicate of another of the same model, thus providing standardization of manufacturing operation.

The parts for each order are cut and stored on the production floor near the jigs and fixtures used for the actual fabrication of the elements of the forms. Parts cut from plate are sheared or flame cut, whichever is more practical for the specific piece. Reinforcing channels and angles are flame cut from rolled stock as it is received from the mill and are also stored in the vicinity of the setting up fixtures, convenient to the setting up and welding process.

Stationary LeTourneau jig cranes with 2½-ton capacity covering a 26-ft radius are used for the handling of the heavy plates and the substructures as they are set up or taken from the setting up and welding fixtures.

Small substructures, such as hoisting sheaves, lifting lugs, and similar structures, are cut, put together in setting up fixtures, welded and delivered to the area where the main setting up fixtures for the form are located.

The spinner feature of the jig allows the positioning of the long side welds, four of which run the full length of the structures, for downhand welding. These basic structures are 28 ft in length.

The joints on these base structures are designed so that one balances the other and the tendency for distortion is minimized. The standardized setting up process in the fixture and the standardized procedure for welding the structure effectively eliminate appreciable distortion in this basic structure. This is very important because the basic structure forms the bottom surface of the foundation which, in turn, is integrally cast as a part of the bottom of the wall structures of the house, and must therefore be true, so that it will evenly distribute the weight of the house on the smoothed-off area of ground at the homesite.

The main form structures for the walls and ceiling of the house as produced by the inside form are made in the fixture shown in fig. 5. Main plates are placed in this fixture against the locating stops, and the various reinforcing angles, channels and other parts are setup and tack welded to the plate. Most of the welds on the side and top members of both the inside and outside form are intermittently welded since this type weld provides adequate strength with a minimum of distortion. Since the outer surface of the structure

will provide the inside finish of the house, care is taken to smooth by grinding all welds on the surface which will be the inside finish of the house to provide a smooth, unbroken finish.

The outer form structures are produced in essentially the same manner as the inner form structures. The main difference is a slight variation in the reinforcement members on the outside of the main plate. They require separate fixtures for setting up and welding. Since the structures are essentially of the same type, although of somewhat different form, the same general principles of manufacture apply to both.

Special care is exercised in maintaining standardized procedure in the welding of these large flat structures and in observing good welding practice. Particular attention is paid to the depth of weld penetration in the corners where reinforcement structures come together and are welded solid to the main plate, and to tying in the welds to provide strong and uniform joints capable of withstanding the repeated stress to which they will be subjected in the process of pouring and manufacturing an almost unlimited number of houses during the life of the form, and for maintaining the rigidity required for faithful stripping of the form.

Special care is also exercised in the flame cutting and other cutting, shaping, and forming of all of the parts of the form structure members to insure a good close fit-up of parts. There are two reasons for this special care. If excessive and abnormal gaps in the fit-up occur, it is necessary for larger amounts of weld metal to be deposited and this is likely to cause distortion and excessive concentration of heat which may lead to localized warping of the surface of the main form sheet. This, of course, cannot be tolerated since the side walls of the forms, both inside and out, form the surfaces of the house and must be smooth and true plane surfaces.

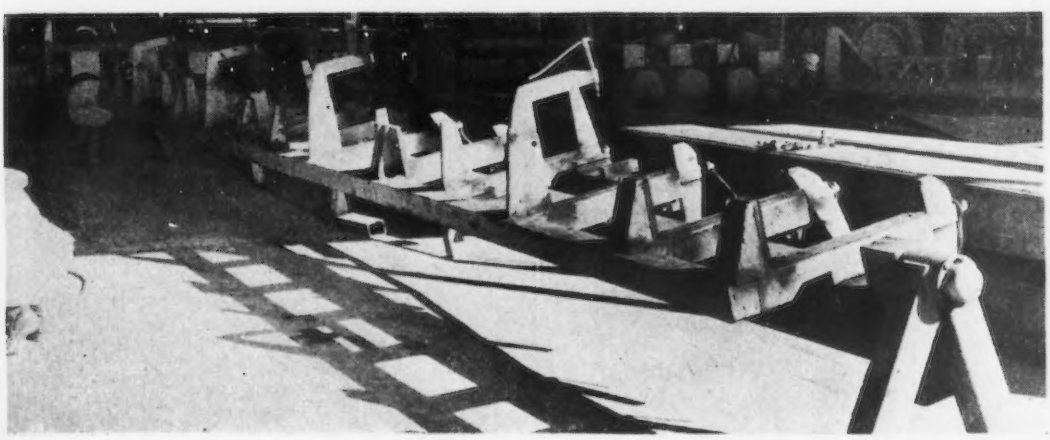

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FIG. 4—A combination setting up and welding positioner for producing the inside form base members.

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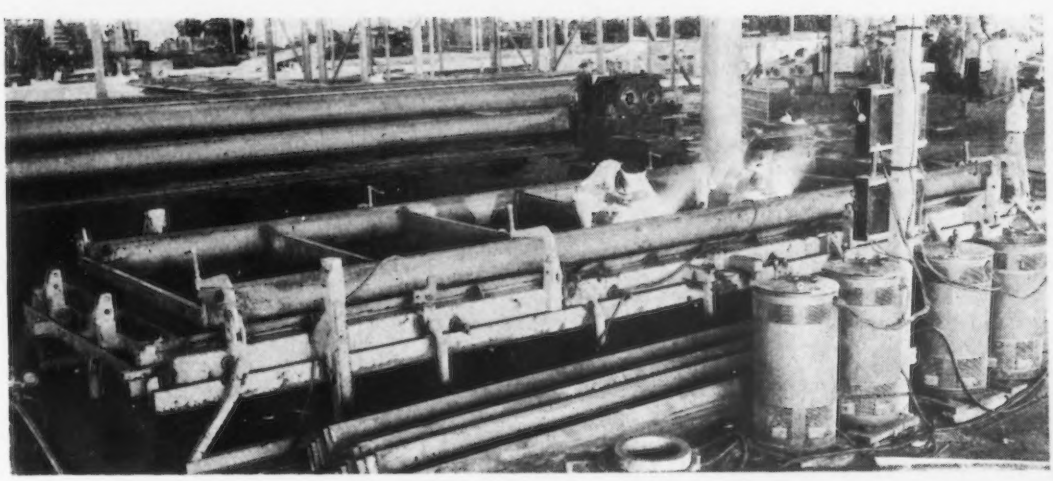

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FIG. 5—This fixture provides stops and clamps for setting up the inside form walls and ceiling main surfaces. Parts are tack welded after clamping, then welded up.

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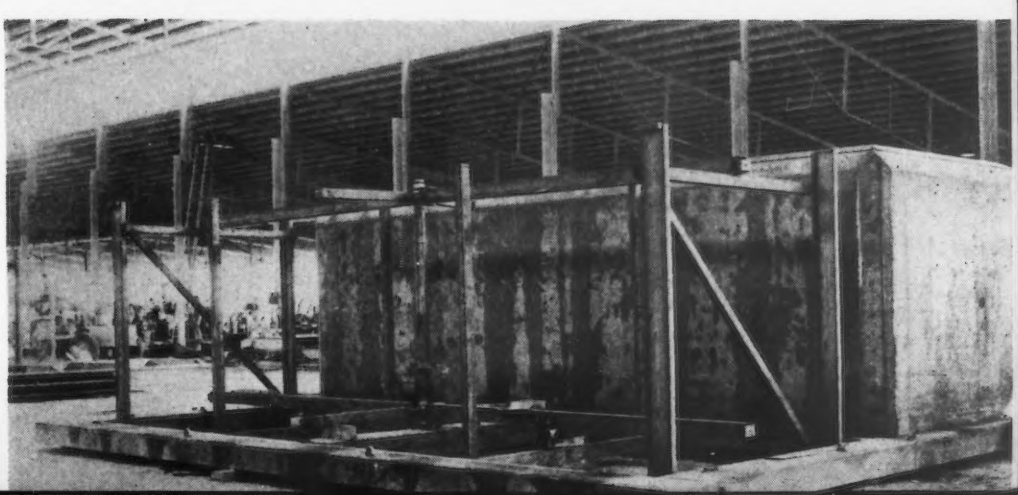

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FIG. 6—Welded structures and substructures are assembled for testing of dimensions, adjustment and dependability of function of the moving parts.

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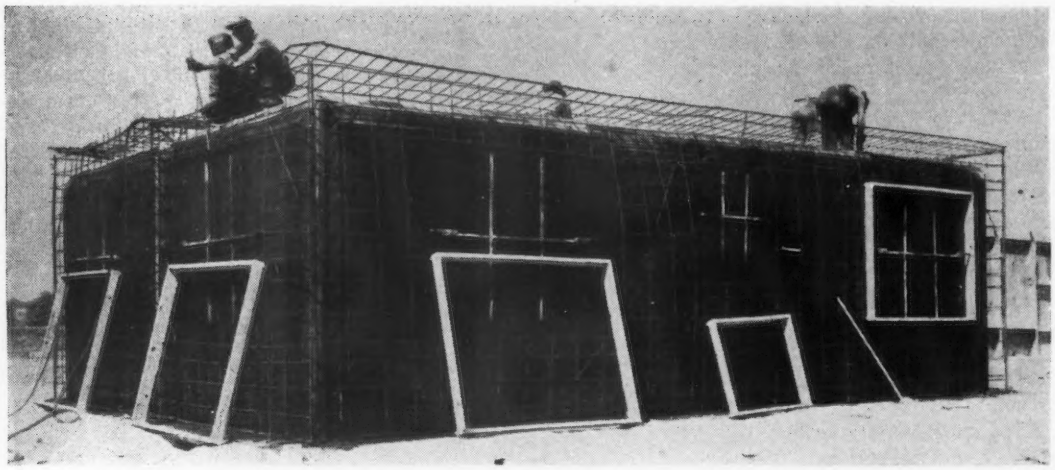

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FIG. 7—Door and window bucks are fastened to the inner frame and the reinforcing steel is welded to insure permanency of position during pouring of the concrete.

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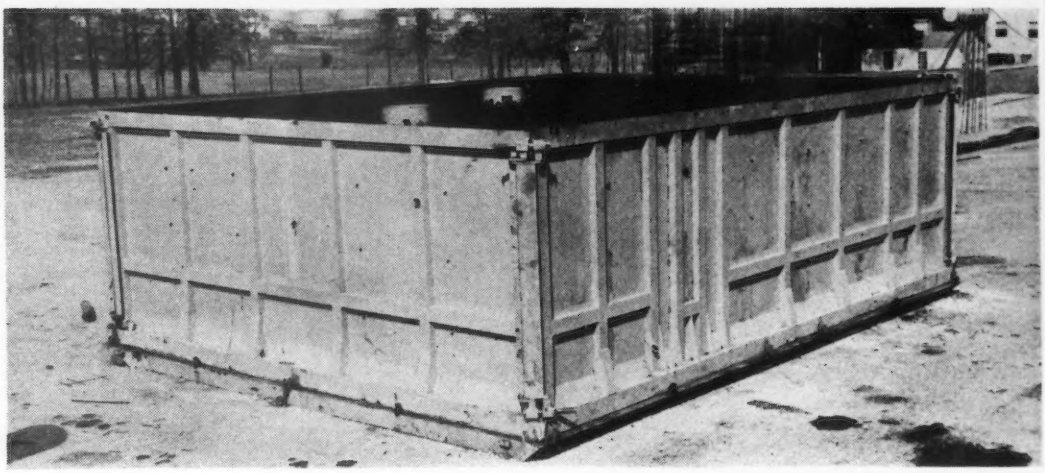

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FIG. 8—The outer form is shown here clamped in place and ready for pouring. Flared sidewalls at the base provide the concrete foundation for the house.

o o o

The second reason is based purely on the economics of arcwelding where the filling of abnormal gaps frequently requires two to three times the amount of time, labor and materials, and therefore considerably increases the cost of the production.

The fundamental design of the structures themselves carefully balances welds so that the stresses from welding counterbalance each other and provide a rigid and durable structure which permanently maintains its shape and trueness in service.

After the parts and substructures of the main form structures have been welded together and finished, they are transported to the adjacent assembly area and the assembly of the completed form proceeds. The inside form is assembled first, the main base structures with the upright supports being bolted together, and the side wall and roof section are assembled to them as shown in fig. 6.

Since the mechanism for collapsing the inside form is held within each part of the inner form, every set of forms is carefully assembled, and the trueness of its joints and alignment of its moving structures checked by collapsing them and reexpanding them to prove the accuracy of the manufacture and assembly of the mechanisms.

Following the completion of the assembly of the inside forms, the corresponding outer form assembly is put together on the base of the inner form and checked for its expansibility, cleanness of fit-up and accuracy of adjustment.

Following the completion of the assembly, both the inner and outer forms are taken to the cleaning and painting department where the inner form and the inner surfaces of the outer form are oiled and the base of the inner form and outside of the outer form is cleaned and painted. This completes the manufacturing process for the set of forms which are then ready to be picked up by the large two-wheeled prime mover and carriage or other handling equipment, and placed in service.

As a logical part of a discussion of why the arcwelded method of production is used, and why it is necessary that these forms be made of steel, brief description of the steps involved in the production of the basic structure of a concrete house is helpful. This procedure is as follows:

(1) Place the expanded inside forms on solid footing in the vicinity of the housing development readily available to the delivery of concrete to the forms by portable, batch-mixing concrete mixers.

(2) Place and fasten the wood, steel, or aluminum window and door openings on the inner form as shown in fig. 7. The prefabricated reinforcement steel is placed and welded around the inner forms and between the two halves of the inner form which produce the center partition in the structure.

(3) Place and fasten conduit and electrical outlets around the inner form, install plumbing roof breather and place ceiling vent in each half of the inner form top.

(4) Hoist expanded outer form, move it into place above inner form, as shown in fig. 8, lower it into place on lower form base, and close it tight on the inner form and door and window openings.

(5) Dismount the outer form from the two-wheeled carriage and prime mover and move it away from the forms to provide clearance for concrete pouring.

(6) Pour concrete into the forms, on top of inner form and inside of outer form, as shown in fig. 9, with agitation and vibration to fill in all spaces and to eliminate voids (32 to 38 cu yd of concrete are required, depending on door and window spaces).

(7) Contour and float the top of house to finish the surface and duct drainage to center of roof and out a spillway trough at side of roof.

(8) Allow concrete to set for 16 to 24 hr.

(9) Relocate two-wheeled carriage and prime mover around forms containing house and connect hoisting sheaves to form.

(10) Collapse the inner forms away from inside of the house structure.

(11) Hoist both the outer form and the house structure vertically above the top of the inside form, and move it away from over the top of the inside form.

(12) Haul the house structure and outer form to the permanent site on which the house will be placed.

(13) Lower the house structure and the outer form until the integrally cast foundation of the house rests firmly on the levelled earth area of the homesite.

(14) Expand the outer form free from the side-walls and cornice of the house structure, leaving the house structure sitting solidly and free in its permanent place on the homesite.

(15) Hoist expanded outer form vertically, above the level of the top of the house structure and move the outer form away from over the house structure, hauling the form back to the inner form for the next house.

(16) Gunite the roof and outer walls of house structure to completely waterpoof it and to provide the final finished color of the house.

(17) Install the plumbing pipe outlets in floor of the house structure, and the piping for "in the floor" hot water radiant heating system (if desired) in its place.

(18) Pour permanent concrete floor and finish the floor surfaces.

The foregoing steps complete the operations necessary to produce and place on the permanent homesite the basic structure for the monolithic concrete house produced by these steel forms.

After the final step, all that remains to be done is to hang the doors, install the windows, install the plumbing fixtures, light fixtures, floor coverings, finish the interior, and proceed with the normal furnishing of the home.

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FIG. 9 — Mobile batch concrete mixer employed for pouring the forms. Each house requires from 32 to 36 yd of concrete. Agitation and vibration are used to eliminate voids and to give a uniform finish to the walls and ceilings.

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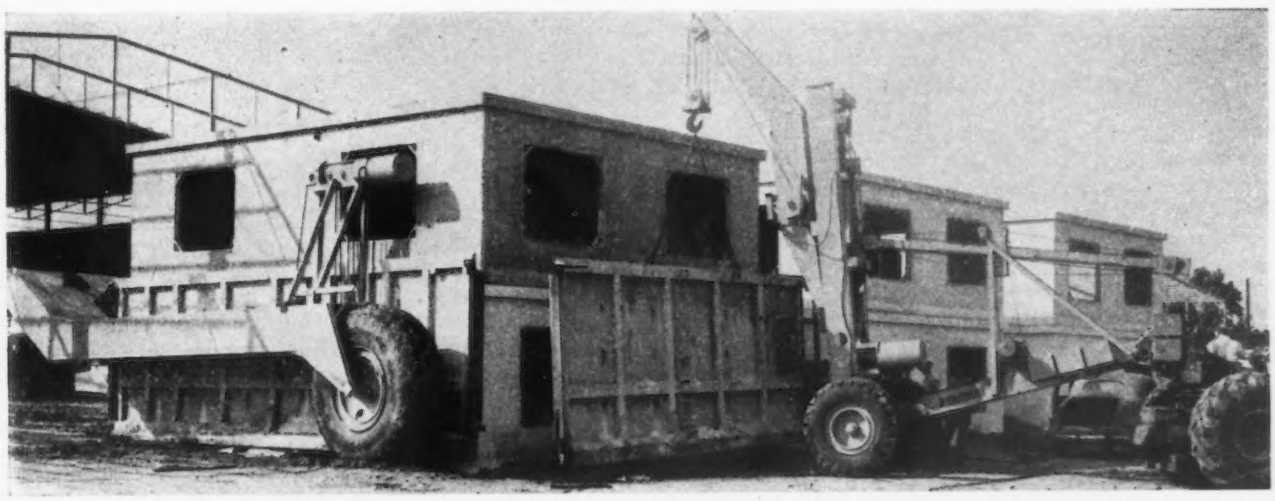
FIG. 10—Two-story structures can be produced by setting one basic form on top of another. The forms are shown here being removed from the poured and set structure.



The steps involved in producing a two-story concrete house consisting of two of the basic structures, such as shown in fig. 10, involves the additional steps of slightly modifying the foundation structure at the base of the walls of the upper shell, a process of building up a false bottom in the standard form which eliminates the widest portion of the standard flared foundation portion of the walls, and the placing of the second shell immediately on top of the first.

The removal of the outer form after placing the upper story shell is accomplished by the simple process of unpinning the rear section of the outer form from the two side sections as shown in fig. 10 and moving the prime mover with the three sides of the outer form forward free of the house, then reassembling the rear section to the rest of the form.

The most important reason for the use of arcwelded steel construction in the building of the forms for production of concrete houses and the building of the prime mover and transporting carriage is the fact that this type of construction provides the lightest weight with the greatest possible strength. The total weight of the carriage structure, prime mover, outer form and house combined, is in the neighborhood of 175,000 lb, a weight which has been adequately demonstrated to be easily floated and supported by the 9½-ft low pressure duomatic tires upon which it is mounted. Any other available means of producing such machinery would involve a greater mass and greater weight which would reduce the flexibility and feasibility of the use of such method of making houses or else greatly increase the number of wheels and tires required to support the weight of the unit. The house alone weighs approximately 40 tons.

Another reason for the welded construction is that it effectively provides a construction with continued smooth, even, and true surfaces which are necessary for the inside walls and ceiling of the house, and the outer wall. The smooth surface of rolled steel is sufficiently uniform and when properly supported by reinforcement maintains its rigid smoothness to a degree which provides a completely satisfactory surface finish for the basic structure of the house.

The mass production of these inner and outer forms and the prime movers and accessory equipment is entirely feasible. It provides a method by which standardized production methods may be employed economically and effectively and with a very satisfactory degree of flexibility in production.

The materials themselves are relatively inexpensive and simple since they are made of rolled steel plates and shapes as they are received from the rolling mill. No additional special finishing is required in the manufacture of these units.

An interesting part of the program of the production of these house forms and other products of the Longview, Tex., plant of LeTourneau, Inc., is that they have a working agreement with the LeTourneau Technical Institute of Texas, a school for the training of mechanics, technologists and production specialists, whereby a student receives laboratory work in the LeTourneau company's plant as a part time paid employee. This plan allows the student to see modern production method for these machines in action and allows them to take part in the actual development, tooling, and production of these modern units.

While they are in the LeTourneau company's plant, they are under the full time guidance of institute instructors and not only receive pay for their laboratory work, but also receive school credit. The plant thus serves in a dual capacity, that of a production organization and an educational laboratory.

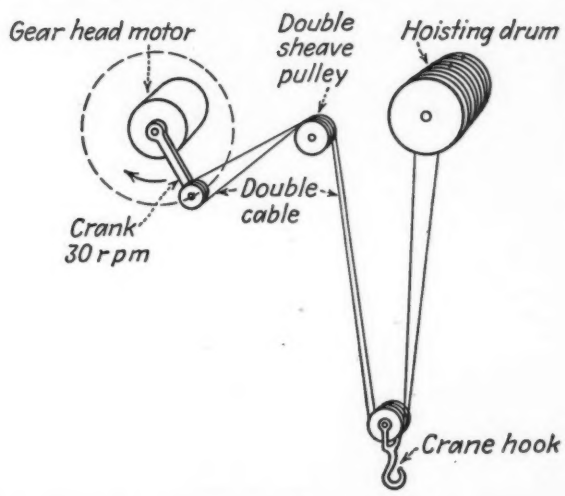
Simple Mechanical Quenching Device

AGITATION of workpieces during the quenching cycle is a recognized procedure in almost all heat-treating shops, but the method of performing this frequently involves a certain amount of difficulty. Engineers at Fellows Gear Shaper Co., Springfield, Vt., however, in modernizing their heat-treat department,* have designed a simple but highly effective mechanism which solves the problem very readily.

* *Modernized Setup Cuts Heat Treat Costs,* THE IRON AGE, *Feb.* 6, 1947.

A Shepard Niles overhead traveling crane is employed to operate over all units in the department. It has multiple speeds on the hoist and is capable of traveling both ways. The hoisting cable is double. The dead end loop was formerly anchored over a pulley that compensated for variations in the length of each cable in operation. This crane has now been equipped with a device for raising and lowering the hoisting hook a distance of 8 in. and alternating 30 times per min. It provides an excellent means of power quenching for hardening and saves many manhours a week.

As shown in the accompanying sketch, the device is quite simple and consists of a four-wheel trailer truck attached to the crane carriage. This truck carries a 5-hp gear head motor to the shaft of which is attached an 8-in. eccentric crank. The dead end loop of the double cable is passed over a double sheave pulley and



looped over a ball bearing pulley on the end of the eccentric crank. This device imparts an alternately lifting and lowering movement to the lifting hook of the crane through the dead end of the cable. The hoisting facilities of the crane enable the work to be raised or lowered during quenching for observation purposes if desired, without stopping the reciprocating motion. Automatic limit switches prevent the hoist from raising the load too high.

Hot Rolling Iron-Carbon Alloys

The adverse effect of graphite in high carbon gray iron on the mechanical properties of hot rolled iron are discussed in this, the second part of a two-part article. The authors cover roll design and consider the feasibility of employing rolled cast iron for piston rings.

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ACCORDING to the literature and the authors' own work, gray iron is much more difficult to shape by mechanical means than white iron. Investigation of the effect of initial structure had already shown that mechanical values are rapidly reduced as the quantity of initial graphite increases. This seemed to indicate that the bad rolling quality of high carbon gray iron may be due solely to the graphite already present. It therefore remained to be determined how high carbon alloys in which an initial ledeburitic structure had become transformed by subsequent annealing with the conversion of increasing proportions of elementary carbon to graphitic carbon would behave on rolling.

For these tests four heats were prepared: (a) with low P (0.1 pct) and 3.1 pct and 3.7 pct C, and (b) with high P (0.6 pct) and 3.3 pct and 3.5 pct C. The metal was poured in green sand and metal molds, the former casts being mainly gray and the latter white. The gray bars, on rolling, behaved very badly, showed deep splits and soon crumbled. The white irons, on the other hand, responded well to rolling. Examination of the structure gave no indication of the mechanical properties which might be anticipated from these mold-cast high carbon bars, but actual tests showed that, in spite of the initial white structure, the higher carbon heats had lower physicals than the lower carbon alloys.

The measured physicals are plotted in fig. 11 against the carbon content. It is seen that from 3 pct C upwards there is a marked reduction in the mechanical values. But the optimum rolling temperature does not appear to be much affected by the carbon content within the range investigated, so that for the complete range from 2.0 to 3.7 pct C a temperature range of 1380° to 1740°F can be inserted in the Fe-C diagram in fig. 12. Comparison with the optimum rolling temperature for carbon steels quoted by H. Sedlaczek[11] indicates that the optimum temperatures for alloy cast irons correspond to those generally accepted for high carbon steels.

This article reports the results of a series of investigations conducted in Germany to establish the effect of various factors on the hot rolling of high test cast iron to determine the feasibility of producing piston rings from rolled iron. In the first part of this two-part article, published in the issue of Feb. 6, 1947, p. 52, the authors reviewed the literature on the subject and discussed the influence of chemical composition, initial structure, thermal condition and rate of reduction.—Ed.

[11] *From lecture notes by Prof. H. Sedlaczek, Technische Hochschule, Aachen.*

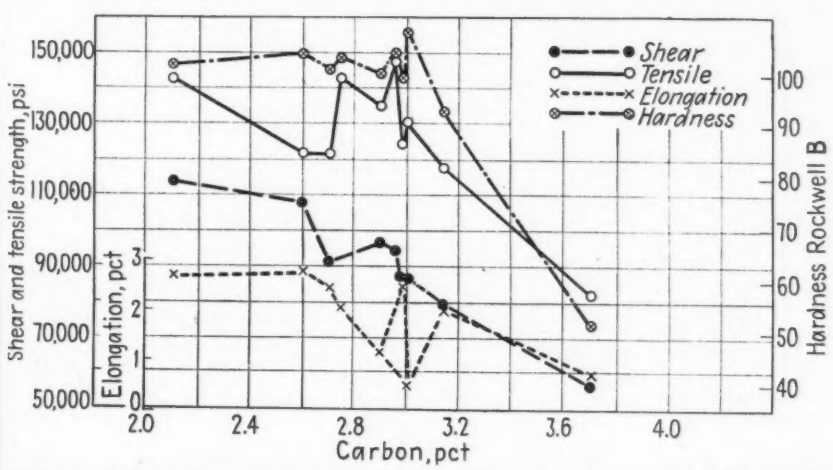
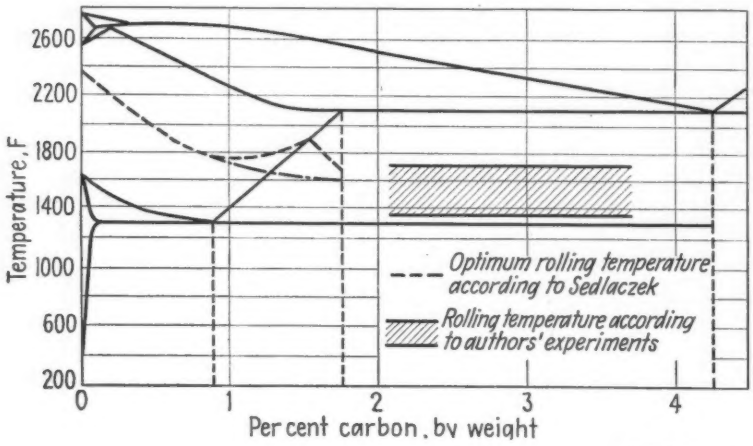


FIG. 11—Relationship between mechanical properties and carbon content for iron with 0.1 pct P.

In discussing the literature reference was made to the use of flat rolls in the early work on the rolling of cast iron, as compared with the authors' use of grooved rolls. Very different stresses are applied to the material by these two types of rolls, for with flat rolls the reduction in height is the same in all transverse sections, while with grooved rolls the pressure is always nonuniform, a condition which must be offset by displacing the material transverse to the direction of rolling.

It might therefore be expected that certain, e.g. more or less graphitic, cast irons would be reasonably easy to roll between flat

rolls, but give bad results with grooved rolls. This difference might already account for the results of earlier work in which it was found that gray and mixed irons could be economically rolled. Further work by the authors has shown, moreover, that the mechanical properties of alloy cast irons of



ABOVE

FIG. 12—Relationship between permissible rolling temperature and carbon content.

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FIG. 13—Relationship between mechanical properties and number of passes for an equivalent degree of reduction.

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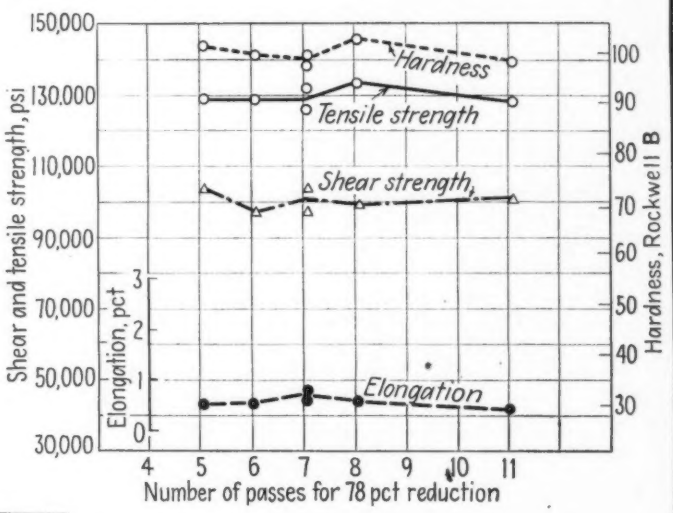
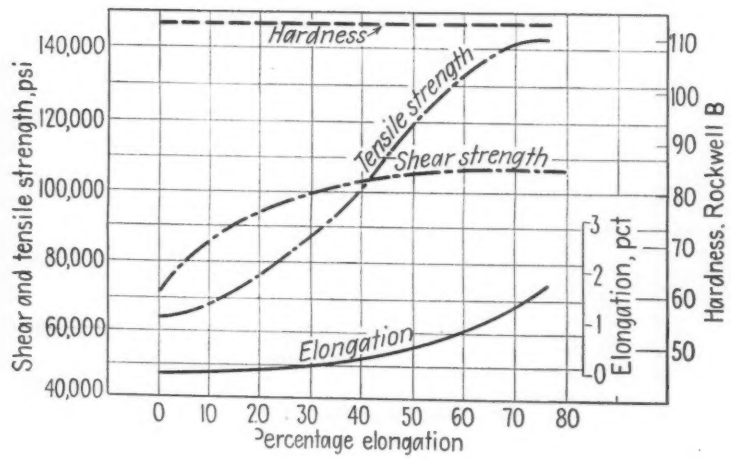
BELOW

FIG. 14—Relationship between mechanical properties and percentage of reduction of iron with 0.1 pct P.





rolling quality are practically the same whether these are rolled between flat or grooved rolls. In only a few cases did grooved rolling give substantially higher physicals.

To get some idea of the permissible degree of deformation per pass, six series of bars of a rolling quality iron were rolled, omitting certain intermediate passes in each test to give a different degree of deformation per pass, the gross reduction being, however, the same in spite of the lower number of passes. Reductions from 0 to 33 pct showed that satisfactory deformation was obtainable only up to about 25 pct sectional reduction per pass, but this maximum reduction was permissible only when the cast structure of the bar had been eliminated by several low-reduction initial passes.

Mechanical tests showed that in spite of a marked reduction in passes the final mechanical values did not differ noticeably from those obtained with lower reductions per pass. This is indicated in fig. 13. Roughly the same values were thus obtained with a total of five passes as with a total of 11 passes.

This work led the authors to propose a slight modification in the roll design, as shown in fig. 1 (lower half) (published with the first part of this article Feb. 6). This modified design gave the same total reduction as the original design, but in only eight passes instead of the initial 11 passes. In the new design, reductions are less in the first passes, gradually increase to 20 pct, being again reduced in the last pass. A rectangle was selected for the cross-section of the final pass in order to reduce the wear at this part of the roll.

Previous writers have already called attention to the marked improvement in mechanical properties which may be obtained by rolling, a result which has been confirmed in the authors' present experiments. For example, the tensile strength of an iron containing 2.9 pct C, 1.3 pct Si and 0.1 pct P increased from 39,800 psi before rolling to 156,400 psi after rolling, while the shear strength was raised from 52,600 to 108,800 psi, and the elongation from 0.33 pct to 2 pct. The same improvement was found with the high-phosphorus alloys; bars with 2.6 pct C, 1.1 pct Si and 1.3 pct P showed an increase in tensile from only 21,300 psi before rolling to 128,000 psi after rolling, while the shear strength was raised from 39,800 to 108,100 psi. The elongation which could not be measured in the cast state was about 1 pct after rolling.

Two further series of experiments were carried out

to determine the relationship between the increase in physicals and an increase in the degree of reduction and whether increasing the reduction during rolling limited the increase in mechanical values which could be obtained. Two heats of the same composition (2.8 pct C, 1.1 pct Si) were selected and differed only in the phosphorus values, viz. 0.1 pct and 1.0 pct. Bars of these heats were rolled at 1560°F at 9.8 ft per sec, the first bars through the first pass only, the second through the first and second passes, and so on. Test pieces were taken from each bar for mechanical tests.

The results obtained are shown in fig. 14.

Apart from the hardness, the mechanical properties showed a sharp increase at the outset, attaining a maximum at 60 pct deformation. As expected the hardness remained practically unchanged, since it is after all determined by the matrix which is substantially unaffected by rolling. It is seen that a deformation of 78 pct, the maximum attainable with the type of rolls used, gave the maximum mechanical values.

Rolled Piston Rings

The work described here was carried out to explore the possibility of fabricating piston rings by rolling. A marked impetus to this work was given by the anticipated increase in the elastic and mechanical properties of the material as well as by the fact that rolling would displace the graphite perpendicular to the direction of travel. The apparent disadvantage of the relatively low carbon required to assure good rolling properties was largely offset by the tangential migration of the graphite in the rings during service.

Wear tests were made on a number of different wear testing machines and gave abrasion values which compared satisfactorily with commercial grades of piston rings. Engine tests indicated a way of making piston rings of rolled cast iron which, with appropriate fabrication, structure and analysis, would have good running qualities. Tests were made in both a single cylinder engine and a six cylinder engine, so that it was possible to compare the behavior of the rolled rings with those of standard manufacture. The rubbing surfaces of both types of rings after the tests revealed no visible differences. These tests also showed that satisfactory piston rings could be fabricated from rolled cast iron and indicated future directions of development.

Summary

Systematic experiments have been carried out on the various factors entering in the hot-rolling of high-test cast irons. The best initial structure for cast iron of rolling quality was found to be a ledeburitic matrix, preferably without inclusions of free carbon. Gray and mixed irons did not respond to rolling, especially in grooved rolls. The presence of graphitic carbon has practically no effect on the rolling qualities of the cast irons investigated.

As the rolling temperature is raised, the response to rolling and the mechanical properties improve, but deteriorate again rapidly from a temperature determined principally by the phosphorus content. Phosphorus values below 0.1 pct impart the best rolling properties and give the maximum temperature interval within which plastic deformation is possible as well as the highest mechanical properties; medium phosphorus values up to 0.8 pct adversely affect these properties, which, however, again show a small improvement at high phosphorus values (1.3 pct).

Speed of rolling in the range between 0.8 ft and 32.8 ft per sec does not appear to affect the magnitude of the properties examined. Even with a white, graphitic initial structure, heats with over 3.0 pct C had lower mechanical properties. The optimum rolling temperatures on the other hand are independent of the carbon content between 2.0 and 3.7 pct carbon.

Tests on roll design have led to a modified series of roll sections which promises to give a more uniform and more rapid reduction with less wear in the final pass.

How the mechanical properties are improved by the conditions of rolling was investigated in two series of tests, the relationship between mechanical properties and degree of deformation being clearly brought out. The maximum increase in mechanical values is obtained with a deformation of between 60 and 80 pct.

New Books

"Magnesium Fabrication," by L. B. Harkins. Practical handbook gives data on all phases of the fabrication of magnesium alloy sheet, extrusions and tubing. Subjects covered range from layout of work through fire control methods. All types of welding and machining, including hand forming, are discussed and illustrated. Pitman Publishing Corp., 2 W. 45th St., New York 19. 150 p., $2.75.

* * *

"Examination of Industrial Measurements," by J. W. Dudley, Jr. Book is designed to acquaint engineers with simple and adaptable statistical techniques for the detection of variation in industrial products. Information is given for constructing control charts, for making quartile analyses and for analyzing the limitations of curves such as are encountered in quality control work. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18. 114 p., $2.00.

"Selective Job Placement," by T. Wagner. The result of 2-years research of worker efficiency, this book defines the best methods of placing workers to obtain maximum efficiency. In addition to discussing in detail the placement of the average industrial worker, the book also covers the placement of disabled workers. Safety aspects of efficient placement are heavily stressed. National Conservation Bureau, 60 John St., New York. 151 p., $2.50.

* * *

"Bibliography of Industrial Engineering and Management Literature," by R. M. Barnes and N. A. Englert. More than 1200 books and bulletins in the general field of industrial engineering and management are listed in this publication, together with 3000 articles and papers on motion and time study and related subjects. An index is included giving a list of the articles under 47 main headings and 79 sub-headings. W. C. Brown Co., 973 Main St., Dubuque, Iowa. 136 p. $3.00

10,000 Trade Names

. . . The seventh section of the Trade Name Directory, compiled by THE IRON AGE as a ready reference for engineers and business executives, is presented herewith. Previous sections of this directory appeared in the issues of Jan. 2, p. 172; Jan. 9, p. 65; Jan. 16, p. 64; Jan. 23, p. 63; Jan. 30, p. 60; Feb. 6, p. 69. This directory tells what a trade name covers, its composition if a material, where or how it is used and the full address of the manufacturer or supplier.

— P —

(Continued)

Planet Steels: Cold-finished steel bars, stainless sheets, bars, pipe and tubing, cold-rolled strip, hot-rolled carbon and alloy spring steel, cold-rolled annealed spring steel, blue tempered and polished spring steel, drill rod. A. R. Purdy Co., Inc., Lyndhurst, N. J.

Planeweld: Arcwelding electrodes for welding aircraft steels and light-gage mild steel. Lincoln Electric Co., 12818 Coit Rd., Cleveland 1.

Planeweld 2: Arcwelding electrode for steel; corresponds to AWS E-6013. Lincoln Electric Co., 12818 Coit Road, Cleveland 1.

Plante: See Gould.

Planeweld: Shielded-arc special steel electrode particularly applicable to SAE 4130 and X4130 steels. Electric Co., 13012 Colt Road, Cleveland 1.

Plaskite: Wheels made of plastic composition for industrial truck casters. Faultless Caster Corp., Evansville 7, Ind.

Plaskon: Urea-formaldehyde and melamine-formaldehyde molding compounds. Libbey-Owens-Ford Glass Co., Toledo.

Plaskon Melamine: Plastic molding compound having low moisture absorption, good resistance to acids and alkalies, high electric strength and extreme heat resistance. For parts exposed to wet or damp environments, in dielectric applications, etc. Plaskon Co., Inc., 2107 Sylvan Ave., Toledo 6.

Plasteel: Sheet steel sealed with plastic, providing complete resistance to weather corrosion, acid fumes, salt air, etc.; flat and corrugated sheets. Protected Steel Products, Washington, Pa.

695 Plastic: Strong, highly refractory, plastic material for hot and cold repairs in basic openhearth and basic electric steel furnaces. Basic Refractories, Inc., 845 Hanna Bldg., Cleveland 15.

Plastic Bronze: Complex Cu-Sn-Pb-Ni alloy for bearings. Alloys & Products, Inc., Oak Point Ave. & Barry St., New York.

Plastic K-N Chrome Ore: Prepared chrome ore ramming mixture for monolithic furnace linings. E. J. Lavino & Co., 1528 Walnut St., Philadelphia 2.

Plastic Roof Resurfacer: Applied to any type of roof surface without heating, for complete overlays and patches. Stonhard Co., 401 N. Broad St., Philadelphia 8.

Plasticlad: High-strength steel with double coating of Thermo-plastic copolymer resin, electrostatically applied then baked; for roofing and siding, ventilators, flashings, gutters, fasteners, etc. Reliance Steel Products Co., McKeesport, Pa.

Plasti-Clyst: Cleaner for transparent plastics. Turco Products, Inc., Los Angeles 54.

Plastiform: Combined ceramic and thermo-setting plastic for making forming-tools, protective coverings, insulators, etc. Duorite Plastic Industries, Culver City, Calif.

Plasti-Goggle: Crystal clear or green plastic goggle formed to fit facial curves with no blind spots. Eastern Equipment Co., Inc., Willow Grove, Pa.

Plast-Iron Powder: Electrolytic (99.5 pct Fe) iron powder for making high-density, high-purity compacts, magnets, tuning cores, etc. Plastics Metals, Inc., Johnstown, Pa.

Plast-Sponge Powder: Sponge-iron (95.98 pct Fe) type powder, soft-nonabrasive, free-flowing, highly compressible; for making machine parts. Plastic Metals, Inc., Johnstown, Pa.

Plastikmould (Plastiktrim): Extruded plastic shapes in a wide range of colors. R. D. Werner Co., Inc., 295 Fifth Ave., New York 16.

Plastipitch: Pitch-type metal weatherproofing coating. Coated Products Corp., Verona, Pa.

Plast-O-Line: Tank lining material for chemical resistance in place of rubber. Heil Engineering Co., 12901 Elmwood Ave., Cleveland 11.

Plastiseal: Chemically inert expanding joint compound used to seal high-pressure steam, oil, gasoline, kerosene, alcohol, tar, creosote, ammonia, brine, acid, air and gas joints. Goetze Gasket & Packing Co. Inc., New Brunswick, N. J.

Plasul Basolit: Plasticized sulfur-carbon compound for checking forging and diecasting dies; used in place of wood patterns because of dimensional stability; used as joining compound for acid-proof tank and floor construction. Nukem Products Corp., 122 Colgate Ave., Buffalo 20.

Plata Metal No. 5: Babbitt for bearings. Atkinson Co., Lyell & Burrows, Rochester, N. Y.

Platers Metal: Brass for springs, diaphragms. Scovill Mfg. Co., Waterbury, Conn.

Platinite: 45-55 Ni-Fe alloy to replace platinum in electric light bulbs. Soc. Anon. de Commentry Fourchambault et Decazeville, Paris, France; R. Y. Ferner Co., 131 State St., Boston.

Platinum: Ortho-phosphate plating solution. A Robinson & Son, 131 Canal St., New York 2.

Platnam: Complex alloy with 54 Ni, Cu-Sn-Fe-Al; for steam valves, valve discs and seats. Hopkinsons Ltd., London, England.

Plaudit: Aircraft maintenance cleaner. Turco Products, Inc., Los Angeles 54.

Pliaduc: Tinplate. Youngstown Sheet & Tube Co., Youngstown.

Pliobond: Synthetic adhesive for bonding wood, metals, plastics, fabrics, ceramics, glass, concrete and various other materials. U. S. Plywood Corp., 616 W. 46th St., New York 19.

Plugmold: Multi-outlet wiring systems. Wiremold Co., Hartford 10.

Plumrite: Brass with 38 Zn, 0.4 Pb for fresh water and chemical plant service. Bridgeport Brass Co., Bridgeport, Conn.

Pluralloy Electrodes: Arc-welding electrodes for welding hardenable steel and steel difficult to weld with normal mild-steel electrodes. McKay Co., York, Pa.

Pluramelt: Composite sheet, plate or strip consisting of one of several Allegheny Metal grades cladding or armor on one or both faces integrally bonded to a mild-carbon steel base. Allegheny-Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22.

Plymetl: Plywood surfaced with galvanized steel or aluminum. Haskelite Mfg. Corp., 204 W. Washington St., Chicago.

Plymouth: Ground chrome ore for maintenance of open-hearth furnaces. E. J. Lavino & Co., 1528 Walnut St., Philadelphia 2.

P M-90: Acid cleaning and descaling compound. Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7.

P. M. G. Alloy: Series of copper alloys with Si-Fe-Zn for pump parts, gears, trolley wheels, spindles, nuts, shafting. Phelps Dodge Copper Products Corp., 42 Wall St., New York.

Polar "K": Organic solvent with powerful action on perspiration, water, oil, dirt, etc.; for steel surfaces. Curran Corp., Dowling Bldg., Malden, Mass.

Poldi: Series of straight-chrome stainless steels for chemical equipment, cutlery and stampings. Poldi Steel Works, Prague, Czecho-Slovakia.

Polly Hi-Temp: Foundry mold coating. Independent Foundry Supply Co., 2325 E. 38th St., Los Angeles 11.

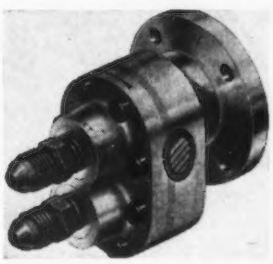
(Continued on page 136)

New Equipment . . .

Plant Service

Booster and pressure pumps, solenoid valves, couplings and metal hose, electrical equipment such as unit heaters, lamp indicators and resistors are some of the items reviewed in this week's new equipment pages. Other devices of general plant utility included are reproducing printers, intercommunication units and floor machines.

1 Series 1200 pump has been designed by *McIntyre Co.*, 717 Riverdale Ave., Newton 58, Mass., for pressure lubrication of bearings of machine tools, diesel engines, turbines, generators and other



high-speed and heavy machinery. This direct drive gear pump is a small lightweight, 8-oz unit. Three standard models displace from 0.08 to 1.5 gpm at speeds ranging from 1140 to 3450 rpm against pressures up to 150 psi. Power requirements vary between 1/100 to 1/6 hp.

Vacuum Booster Pump

2 The B-6 booster pump, type 107, which *National Research Corp.*, 100 Brookline Ave., Boston 15, has announced, is a 6-in. diffusion vacuum pump designed to work at higher than ordinary pressures. Full speed of 1200 cfm is maintained from 1.5 to 7 microns of mercury, while at 100 microns the pump handles 240 cfm. Recommended operating range is 0.5 to 300 microns and blank-off occurs at 0.008 microns. B-6 is said to provide high capacity in the critical pumping range of many industrial high vacuum operations and may be used in conjunction with a mechanical pump alone, or as a booster pump for other diffusion pumps.

Rotary Hand Pump

3 Several advantages are claimed for a rotary hand pump which has been designed by *Bowser, Inc.*, Fort Wayne, Ind. This rotary pump has a capacity of 10 gpm at a normal cranking speed and is of the vane type. Suction and discharge ports are threaded for ¾-in. iron pipe. Rustproof working parts are said to eliminate the "freezing" action of rust due to condensation within the casing when the pump is not used frequently. The pump is furnished as pump only, as a barrel pump with suction pipe, bung attachment and spout, and as a complete refueling unit with discharge pipe, combination hose holder and vacuum breaker, gasoline hose and aluminum nozzle.

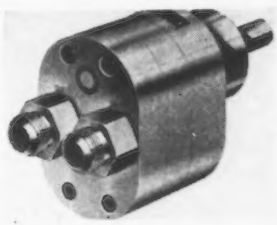
Roto-Blade Pump

4 Outstanding features of an equalized roto-blade pump, which has been announced by the *John S. Barnes Corp.*, Rockford, Ill., are quiet operation, high efficiency, minimum maintenance costs, and working pressures to 1000 psi

continuous or 1500 psi intermittent. The pump is available in many combinations, as a single or double pump, single or double pump with feed pump, and a single pump with gear pump. Capacities range from 8.5 to 50 gpm. Factors responsible for long life and high efficiency are that bearing loads are neutralized by equalized and diametrically opposed radial hydraulic thrust loads and that the impeller assembly may be removed and a new assembly inserted.

High Pressure Pump

5 Designed for high pressure application for material handling equipment, machine tools, power transmission and low capacity pressure circulation and delivery functions, Series 700 direct drive spur gear pump has been announced by the *McIntyre Co.*, 717 Riverdale Ave., Newton 58, Mass. The pump is a small 6-lb unit operating with

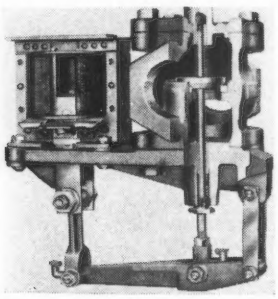


a volumetric efficiency in excess of 90 pct and a mechanical efficiency in excess of 80 pct, it is said. Four models displace from 0.4 to 9.6 gpm at speeds ranging up to 1750 rpm against working pressures up to 1000 psi. Standard models are designed for direct motor application, but pumps can be furnished for flange, belt, spline and other drives. Power requirements vary between fractional to 6½ hp. Pump body is constructed of aluminum with nitrided nitralloy gears.

Direct-Acting Valve

6 Combining full flow with the ability to operate under differential pressures as high as 150 lb a solenoid valve has been developed by *Johnson Corp.*, Three Rivers, Mich., which can be used for all types of liquid level control, with hot and cold water, steam, oil and other processing liquids. This valve which is direct-acting, is designated as a globe screwed type, and is designed and built for heavy duty service. A lever arrangement provides ample power to insure positive opening of the valve. Single seat construction increases the temperature range, it is said. Body of the valve is of cast iron or bronze, with top cap and bottom section bolted to body. Valve, seat and valve stem are of stainless steel. It is avail-

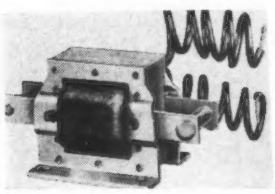
able in two series: type HH in sizes from ½ to 1½ in. is for differential pressures ranging from 125 to 150 lb; type HL, sizes 1 to 3 in. is for medium and low differential



pressures. Standard models are furnished for operation 110, 220, or 440 v, 60 cycle current.

Midget Size Solenoid

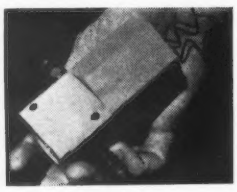
7 Engineered for long life and trouble-free, dependable service, Midget-size solenoids have been announced by the *John S. Barnes Corp.*, Rockford, Ill. Hammering action is said to have been entirely eliminated and specially treated coils are unaffected by oil or coolant. Extra heavy feet and side plates are made integral to provide greater strength and rigidity. Phosphor bronze plunger guides offer better bearing surfaces, it is said, and compact design assures economy both of space and



operating cost. This compactness also makes the solenoid easily adaptable to most applications. Sufficient force is exerted for actuating most pilot valves and other control structures.

Two-Way Valve

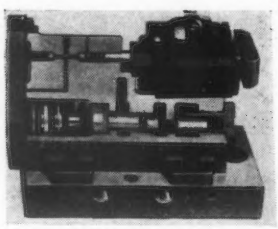
8 A solenoid - operated two - way valve has been produced for a wide variety of industrial uses by *Electrol, Inc.*, Kingston, N. Y. By combining a solenoid with a two-way valve in one small, compact unit, remote control of the hydraulic valve has been achieved. Its small size makes it suitable for installation in hard-to-reach or congested areas. The valve weighs only 1¼ lb and measures 3 9/16 in. long x 1¾ in. hexagon. The aluminum housing has two ⅛-in. NPT female ports and two mounting



holes for easy attachment in operating position. The device accommodates flows up to 2 gpm and the pressure range is from a fraction of 1 psi up to 1500 psi.

Solenoid Air Valve

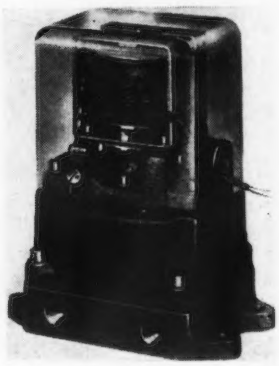
9 Model SV-4, a new 4-way, 4 port, solenoid operated air valve with positive, high speed operation has been designed for controlling air cylinders actuating machine tool operations. Produced by *Automatic Valve, Inc.*, 37415 Grand



River Ave., Farmington, Mich., SV-4 is small, compact and lightweight and can be mounted close to air cylinders, eliminating excessive piping and waste of air. It is also made in 5 port type for differential air pressures, 0 to 150 lb. These valves are of the pressure sealed poppet, shuttle type, stemless, with solenoid plunger travel of ⅛ in. and are made in ¼, ⅜, ½ and ¾ in. sizes. Operating power values are 1.42 amp in-rush at 110 v, 60 cycles, 0.22 amp sealed. All parts of 4 and 5 port types are interchangeable. They can be mounted in any position.

Four-Way Valves

10 Known as SR-4 series, 4-way solenoid-controlled 4-port and 5-port valves have been developed by *Numatics*, Milford, Mich. Designed for simplicity and wide range of adaptability these valves can be mounted in any position with either side or bottom pipe connections used. Two poppet elements, without springs, alternately open and close to pressure and exhaust by "fluid lever" air from a solenoid-operated central distributor. These poppet elements control the respective ends of a double-acting air cylinder, with either single or dual pressure. Any working pressure from 0 to 150 psi is han-



dled with efficiency, it is reported. One size, low amperage, solenoid with 5/64 in. travel is used for all pipe sizes. The valve is available with 4-port base for single-pressure and with 5-port base for dual-pressure service, in the pipe sizes of ¼, ⅜, ½ and ¾ in.

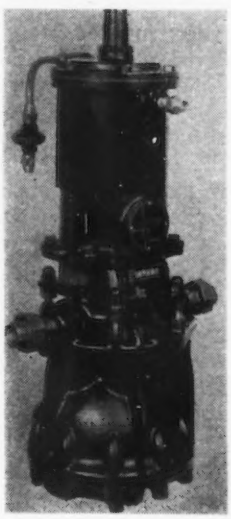
Retaining Rings

11 Retaining rings of two-part interlocking construction have been announced by *Waldes Kohinoor, Inc.* Long Island City 1, N. Y. Fitted over a shaft in a radial direction, the ring forms a complete annular shoulder of uniform sec-

tion height around the circumference of the shaft thereby eliminating any gap. This feature substantially increases the normal thrust capacity of the ring, it is said. Consisting of two mating halves that interlock, the ring is of dynamically balanced design making it suitable for equipment involving high rates of rpm. Because of its positive interlocking action, it is reported the ring cannot be lifted out of its groove by high centrifugal forces or by linear expansion caused by friction with abutting parts or surfaces. Disassembly requires only a slight prying action with a screw driver.

Oil Flow Controller

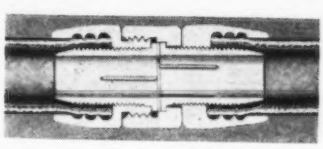
12 Accurate measurement and control of heavy fuel oil in connection with combustion control is said to be possible with the Transometer developed by the *Askania Regulator Co.*, 1603 S. Michigan Ave., Chicago. This unit



makes possible control, integrating, remote indicating and recording of the flow of oil. A combination of a piston type, positive displacement meter and a pneumatic signal transmitter, the Transometer can be used with other liquids, particularly viscous fluids, as its accuracy, it is said, is unaffected by viscosity changes. It is also applicable where wide flow variations are encountered.

Hose Coupling

13 Production of a streamline, high-pressure hose coupling for use in fire, chemical, oil and spray hoses where pressures exceeding 1000 psi are employed, has been announced by the *Bar-Way Mfg Co.*, Stamford, Conn. The coupling is said to weigh ⅓ to ½ less than any comparable coupling. In the ½-in. size it is 3¾ in. long with an overall diam of 1⅜ in. Full



diameter of the hose is maintained throughout the connection, it is said, with no reduced flow or shrinkage of the hose itself. The couplings are remountable so that broken hose can be repaired in the field. They are made in ½, ¾ and 1¼-in. sizes.

Flexible Metal Hose

14 For covering electrical wiring used on any type machine which may contact oil or moisture, the American Metal Hose Branch of the *American Brass Co.*, Waterbury 88, Conn., has announced the manufacture of Sealtite electrical conduit, which is made of a galvanized steel flexible tubing covered with a substantial thickness of oil-proof synthetic material. Conduit fittings are standard pipe thread, and are available in two styles; either permanently attached at the factory, or reattachable for assembly on the job. In addition to being liquid-tight and extremely bendable to very small radii, Sealtite is constructed to resist abrasion and stand up against the ordinary abuses encountered in shop operations.

Machine Tool Conduit

15 Synthetic-covered shielding conduit has been added to the line of flexible metal hose manufactured by *Chicago Metal Hose Corp.*, Maywood, Ill. Designated Rex machine tool conduit, RT-25, the product, built to machine tool electrical standards, is said to be extremely flexible and durable. The conduit features galvanized steel flexible metal hose liner and synthetic cover. It is liquid tight externally; is usable with both standard and watertight conduit boxes; and is furnished with fittings which are attachable and reattachable, or which can be permanently attached at factory.

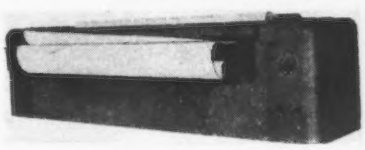
Intercommunication Units

16 Dust and moisture-proof, metal-housed, industrial type intercom staff stations for remote and privacy operation have been introduced by *Executone, Inc.*, 415 Lexington Ave., New York 17. Steel-cased and built for rugged wear, these compact stations are designed to solve communication problems in refrigerated rooms, shipping and receiving platforms, foundries, and other locations where they will be exposed to rough usage. Equipped with a call-origination button, the remote type Model C-22 unit permits the user to receive a call and reply from a distance of 20 ft without approaching the station. These units are 6 in. wide x 6 in. high x 3 in. deep. Model 1100 executive in-

tercom station, illustrated, includes an audio-amplifier circuit, alnico speaker, neon pilot lamp, and insulated moisture proof interior wiring. Used in a system of 12 stations, this unit provides facilities for private, two-way voice communication with any combination of 11 other similar executive or staff stations. Push buttons identifying each station enable executives to originate calls selectively. By use of a toggle switch, an executive can receive calls and reply remotely from across the room, without approaching the unit to depress the talk key. As many as 6 independent two-way conversations are possible at the same time in a system employing 12 stations.

Continuous Printers

17 Improved B-2 and B-3 table-type continuous printers have been announced by *Peck & Harvey*, 5736 N. Western Ave., Chicago 45, which are said to make possible faster exposure, finer reproduction, and greater operating efficiency, for intermittent or continuous



duty. They expose direct process black and white prints, blue prints, and ammonia-type prints, from tracings, charts, drawings, letters, etc. They are said to produce clear, sharp, true-to-scale prints up to 44 in. wide in a continuous operation, from cut sheets or roll stock, in any lengths, at speeds from 6 to 42 ipm. The machine is compact, easily portable for use on table, stand or

bench. Both models operate on 110 v, 60 cycles ac. The printer occupies space 68 in. long x 16 in. wide x 17 in. high.

Reproducer

18 Designed to meet the printmaking requirements in drafting room or office, a positive printing, dry developing machine called the Streamliner has been announced by Ozalid, Div. of *General Aniline & Film Corp.*, Johnson City, N. Y. The Streamliner reproduces drawn, typed, printed and photographic material in 25 sec, delivering prints at speeds which range up to 10 fpm. In seconds the Streamliner also reproduces photographic material from translucent film positives which can be made from any nega-

tive. Dryphotos made in the Streamliner possess full tonal values, it is reported. Lines and images on originals can be reproduced in black, blue, red, sepia or yellow, on paper, cloth, foil, film, or plastic. The machine accommodates materials up to 42 in. wide and of any length, processing roll stock and cut sheets in exactly the same manner.

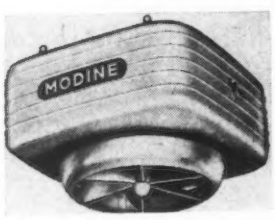
Printer Developer

19 Designed to provide simple and economical printing and developing facilities for producing black and white prints in medium quantities, a BW printing and developing machine known as the Model 41, has been announced by *Charles Bruning Co., Inc.*, 4754 Montrose Ave., Chicago 41. This model combines individual printing and developing units in a cabinet with an all steel frame. Printing speed range is up to 6 fpm, depending on the transparency of the original, printing either roll stock or cut sheets, with a printing width

of 46 in. The light source is a 2000 w glass mercury vapor lamp within a 6-in. diam cylinder. Printing speed is controlled by a single knob. The tangential method of feeding is said to assure safety to the tracings and eliminates pinching or catching. The unit is mounted on casters and can be moved to and operated in any desired location.

Unit Heaters

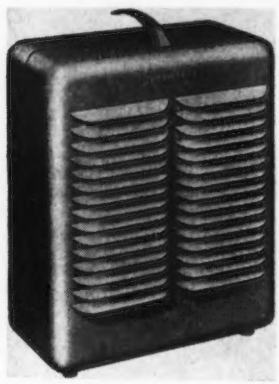
20 A line of propeller unit heaters has been announced by *Modine Mfg. Co.*, Racine, Wis., which features three distinct types of units with a total of 47 basic capacities. To the conventional horizontal and vertical delivery types, has been added a powerful draw-through



unit which provides horizontal discharge of heated air over an extra-long range. Known as the Power-Throw, this type may be used alone, or in combination with the other two types of unit heaters. All three types are available in standard models as well as in models designed to provide low outlet air temperatures when used on steam pressures of 30 lb or more. Models specifically designed for hot water application and for drying and processing jobs are also included in the new line. A wide range of heat throw patterns are available, made possible through the use of several air distribution devices on the units.

Electric Heat Fan

21 Designed for use in factories, shops, warehouses, etc., a master duty heat fan has been announced by *Thermador Electrical Mfg. Co.*, 5119 District Blvd., Los Angeles 22. Utilizing Thermador's forced-air principle, the heat is drawn off the circular heating coils by a four-blade fan and forced out



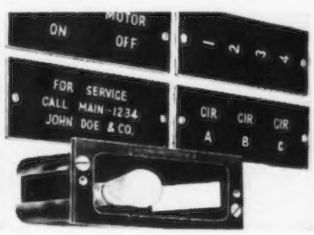
and down through a horizontal grille. With the heating element switched off, the fan may be operated individually to circulate cooling air. The fan weighs 19½ lb and is 19¼ in. high x 14¼ in. wide x 8⅛ in. deep. It is available with thermostatic control or with rotary range type, 4-position switch.

Lamp Ballast

22 For the operation of two 12-in. Circline lamps, a Tulamp, disk-shaped, high-power-factor ballast has been announced by the Specialty Transformer Div., *General Electric Co.*, Schenectady 5. The Tulamp principle of lamp operation practically eliminates cyclic light variation because the lamps are operated out of phase with each other. The flat disk construction of this ballast, with a center hole for mounting, makes it easy to assemble on the stem of a portable lamp or conceal in the lamp base. It is also adaptable to shallow-type wall or ceiling fixtures.

Lamp Indicator

23 Known as the ML unit, a lighting device of an indicating nature has been manufactured by the *H. R. Kirkland Co.*, Morristown, N. J. Molded of Bakelite, the basic lampholder housing can be furnished for use with one, two, three or four S6-120v bulbs of ¾-in. OD or smaller diameter bulbs. A variety of face plates are obtainable. In those illustrated, having black-faced plate with engraved markings shown in white, the inner core is translucent and when the lamp lights the message is illuminated in white. Color may be used. Such a plate serves dually in that only one unit creates the nameplate and the indicating light. Other plates have bull's-eyes, with and without markings, used when full side-



visibility is desirable. Momentary contact and on-off push switches which light up can be used with or without markings. Overall plate dimensions are 3¾ x 1½ in., with 3 x 1 1/16 in. allotted for actual light area.

Resistors

24 Development of Bulletin 26 fluorescent lamp resistors of the plug-in type has been announced by the *Ward Leonard Electric Co.*, Mt Vernon, N. Y. They are designed for use with single lamp portable fixtures for operation of fluorescent lamps on dc. The

wire-wound fixed resistor is mounted on a small perforated metal enclosure measuring 1⅝ in. in diam x 1 13/16 in. in height. Operating as an adapter unit, the resistor is plugged in between the lamp fixture and the dc outlet. The resistor unit requires no wiring and is connected in series with the auxiliary dc ballast, serving to limit the fluorescent lamp current.

Floor Machine

25 An extra-low disk-like floor machine for polishing, scrubbing, steel wooling and other maintenance has been introduced by the *G. H. Tennant Co.*, 2350 N. Second St., Minneapolis. Unique feature of the machine is a special slide-polishing brush which cleans and polishes flush with the walls, even polishing the baseboard. The brush has bristles extending 2 in. beyond the circumference of the disk, eliminating bumping and scratching furniture. Overall height of the machine is less than 12 in. with a pancake-shaped motor centrally mounted over the cleaning disk. Designed for use on all types of floors, it accommodates 15-in. accessories. Weight of the machine equipped for use is about 100 lb.

Drum Type Floor Machine

26 Floors can be dry-cleaned, burnished, sanded, waxed, polished or scrubbed with an all-purpose drum-type floor machine developed by the *G. H. Tennant Co.*, 2350 N. Second St., Minneapolis. An outstanding feature permits cleaning, waxing and polishing in one operation by use of a hard bar wax cartridge held in contact with a cylindrical brush or steel wool roll. The machine is said to work equally

well on wood, asphalt, cork, linoleum and concrete. A vacuum system powered by a 5000 rpm fan, controls dust in all operations. A 1-hp motor has a reversing lever and two-step pulley provides drum speed of 1400 rpm for sanding and 800 rpm for other operations

Floor Repair Compound

27 Swift Floor, a new repairing compound for concrete floors,

TIME-SAVER CARD for your convenience in obtaining, without obligation, more information on any one or more of the new equipment items featured on this and following page.

2/13/47

THE IRON AGE, New York 17, N. Y.

Circled below are items on which I request more information

☐ CATALOG ☐ NEAREST SUPPLY, SALES OFFICE ☐ PRICE INFO.

1 2 3 4 5 6 7 8 9 10
11 12 13 14 15 16 17 18 19
20 21 22 23 24 25 26 27 28 29

NAME..... TITLE.....

PLEASE STATE BUSINESS.....

COMPANY .....

CO. ADDRESS .....

CITY..... ZONE.... STATE.....

FIRST CLASS
PERMIT No. 36
(Sec. 510 P. L. & R.)
New York, N. Y.

BUSINESS REPLY CARD
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THE IRON AGE
100 E. 42nd St.
NEW YORK 17, N. Y.

has been announced by the *Monroe Co.*, 10706 Quebec Ave., Cleveland 6. Floors can be used the instant Swift Floor is laid, with the patch getting tougher as loads pass over it because the compound sets by compression rather than by water evaporation. It will not crack, crumble or curl, it is reported, contains no asphalt, cement or gravel and comes ready for use. The compound can be used indoors or out.

Tube Expander

28 To permit fast repairs where boiler construction makes the tubes inaccessible for ordinary retubing methods, an arch tube expander has been produced by *Richard Dudgeon, Inc.*, 24 Columbia St., New York 2. It has been designed to roll the far ends of tubes into the tube sheet in installations where no provision is made to gain entry for readily rolling the tubes. The expander enters from the smoke box, or fire door, and reaches through the whole length of the tube to roll the far end. A revolving stop collar on the frame extension permits adjustment of the expander for various lengths of tubes. Tapered rollers provide parallel expansion. The expander is furnished with tapered and flaring rollers to flare as well as expand the tubes, or tapered rolls for expansion only. It is manufactured with a solid frame shank as shown, or in two parts joined by a quick-acting coupling. The mandrel is also furnished solid or in two parts.

Masonry Drills

29 Improved carbide tipped masonry drills for drilling holes in concrete, brick, tile, marble, slate and plastics, have been announced by *Carboloy Co., Inc.*, 11157 E. Eight Mile Rd., Detroit 32. The improved line of drills now includes 15 sizes, ranging from 3/16 to 1½ in. and features a solid round shank without flutes said to give greater strength and maximum support to the Carboloy cemented carbide cutting tip. The most popular sizes have been made available in a handy kit form and include drills of 3/16, ¼, 5/16, ⅜, ½ and ⅝-in. nominal diameter drills. The drills can be used in any rotary portable drill or hand brace. They may also be used in drill presses, it is said.

Spanner Wrenches

30 Adjustable spanner wrench sets have been added to the line of tools manufactured by *JO Mfg. Co.*, South Gate, Calif. They are available in three sizes, fitting the following range of diameters: ¾ to 2 in., 1¾ to 4 in. and 3½ to 6 in. Wrenches are of forged steel, heat-treated and cadmium plated. A set consists of a handle, removable screw, a key arm, and three pin arms in graduated sizes. The spanner wrenches fit the range of diameters specified with any standard mechanic's handle.

Smoke Indicator

31 Designed to indicte the density of smoke passing through the flue or breaching of a heating or power plant and to signal when this density approaches the values prescribed by municipal smoke ordinance, a photoelectric smoke indicator, type A20C, has been announced by *Photoswitch Corp.*, 77 Broadway, Cambridge 42, Mass. Type A20C consists basically of a photoelectric control and light source. These are mounted on opposite sides of the flue, and the light source beam is projected across the flue onto the photoelectric control. A sensitivity adjustment permits the equipment to be set so that it will signal when smoke density approaches the prescribed maximum set by the municipal smoke ordinance. Supplementary equipment available includes bell alarms to signal excessive smoke, densometers to give continuous indications of smoke density and recorders to record the time of day at which excessive smoke passes through the stack.

Water Clarifier

32 To clarify a water containing appreciable turbidity or color, the *Liquid Conditioning Corp.*, 423 W. 126th St., New York 27, has developed the Liquon sludge contact reactor. This unit combines the operations of mixing the raw water with the coagulating chemicals, properly agitating the mixture, maintaining a suspended deep sludge bed or blanket of previously accumulated precipitates, separating the clarified water from the sludge, and concentrating the impurity-saturated sludge for minimum volume of blowoff. The sludge contact reactor is equally well adapted, it is said, for coagulation of turbid, colored water, for softening of hard water, and for removal of iron, manganese, silica or fluorides from water.

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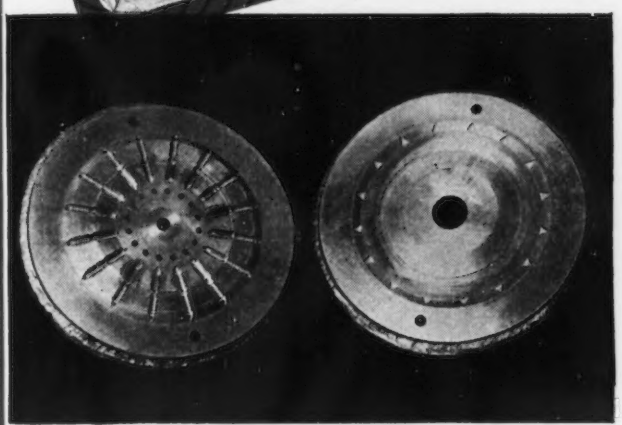
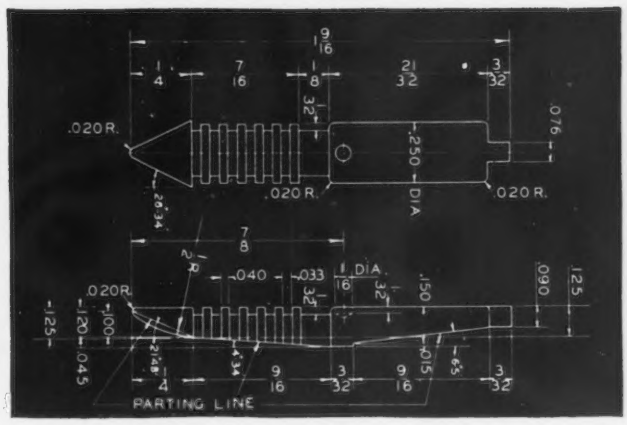
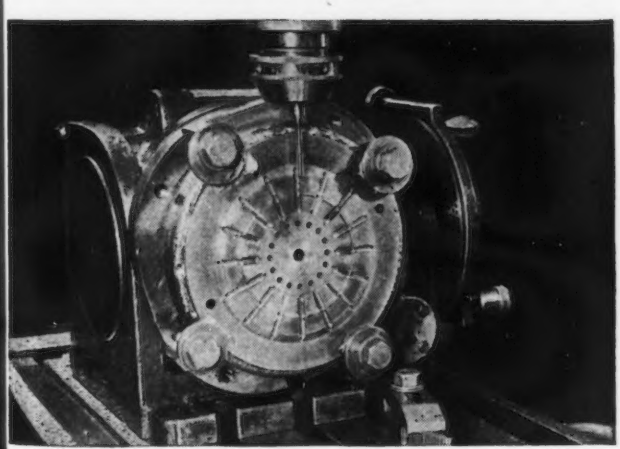
How to Mill an intricate 16-Cavity Injection Mold complete..averaging 8¾ hours per cavity!



FAST! Both halves of this 16 cavity injection mold for an ink feed part for desk pens milled complete and ejection pin holes spotted in 140 hours! That's typical performance of a Kearney & Trecker — Milwaukee Model 2D Rotary Head Milling Machine on difficult mold making jobs.



DIRECT! These multiple contours were transmitted direct from print to mold block. No fussing with templets or models. One cavity accurately located and each operation successively duplicated after indexing on a dividing head. That's the Rotary head method of "multiple origination."



ACCURATE! Single setup reduced chance for error. Operator relied on built-in precision control and measuring devices for precise end results. Ejector half tipped 90° and special cutter used to square groove corners.

Job Data Courtesy of Sengbusch Self Closing Inkstand Company

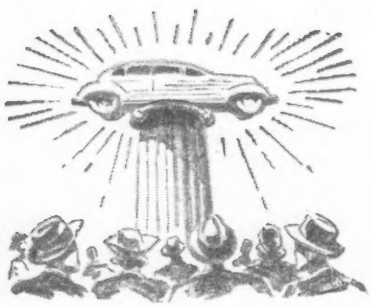
KEARNEY & TRECKER CORPORATION
MILWAUKEE 14, WISCONSIN 4718

For more facts of how you can get Fast, Direct, Accurate results on other mold, tool, die, pattern, toolroom and general production work, using the Rotary Head Method, write for bulletin 1002C on the Model 2D Rotary Head Milling Machine.

Assembly Line . . .

WALTER G. PATTON

• Car buyers standing in line in Detroit are decreasing but a 6-months' wait is still necessary for popular makes . . . Financed deals are increasing.



DETROIT—If you are strongly tempted to write your best friend in Detroit and ask him to get delivery for you early in March of a new Chevrolet, Plymouth, Ford, Dodge, Buick, Pontiac, DeSoto or Oldsmobile, try to restrain yourself. Your friend will appreciate this gesture on your part. And automobile producers who know that many dealers still have orders on the books dated December 1945 and earlier will also be grateful.

If your heart is set on a Nash you may be able to take delivery of your new car in Detroit before June. Much depends on the dealer. It may also depend on whether or not you have a trade-in.

Dealers aren't insisting on trade-ins; but a trade-in helps, denials to the contrary notwithstanding.

On the other hand a new Hudson or a new Kaiser-Frazer or Willys station wagon will probably be delivered to your friend 2 weeks after placing the order, depending on the dealer and the model desired.

Quite obviously exception may be taken to any of these delivery dates. Anyone willing to pay the high dollar can probably find a dealer who will arrange quicker delivery.

During the past week the writer made a survey in person and by telephone in which 43 Detroit automobile dealers were asked when they could deliver a new car of a certain make and the conclusions given above seem justified on the basis of these conversations.

It is undoubtedly true that the number of new car buyers standing in line has shrunk considerably since last autumn. Nevertheless, the shortest delivery date promised by any of the Ford, Chevrolet or Plymouth dealers called on the telephone was 4 months. The average was 6 to 8 months.

Many dealers are hesitant about quoting a delivery date for a new car, particularly over the telephone. They remember the headaches experienced during the past year as a result of making too optimistic promises to some of their best customers. Some dealers may even intimate that you are probably one of their customers trying to check up on them.

IT is very much the exception for a dealer to admit that cancellations are a factor in today's new car market; most dealers will tell you only 1 or 2 pct of their orders are being canceled, although a Chevrolet dealer admitted he had had 53 cancellations in 1946. Most of these cancellations were G.I.'s who, he explained, "came into the showroom with a fistful of money, but are now finding things just a little tougher than they expected."

There can be little doubt that order cancellations would be higher if it were not for the fact that new cars continue to sell on Detroit used car lots for $100 or more higher than the new car price.

When inquiring about delivery of a new car, the writer gave his correct name, explained that he was interested in buying a new car and asked about an approximate delivery date. Oddly enough not one of the 29 dealers called on the telephone asked for our address and telephone number. The usual response was, "Next time you're out this way drop into the salesroom and ask for Joe Glutz." One salesman, associated with a Kaiser-Frazer dealer, volunteered to make a personal call to "talk things over."

A Plymouth dealer slightly bored by the whole procedure said that he had not taken a new order for more than a year and he anticipated no change in his policy. "My backlog of orders has been growing since last spring," he added. "We now have 1200 orders on the books backed by deposits and see no advantage in adding to the present list."

Several dealers asked about the car we are now driving but it is quite evident that they are not currently interested in building up lists of prospects to be used possibly before the end of the year when most dealers admit they may again have to start selling cars instead of merely taking orders.

Based on the telephone survey, Chevrolet and Plymouth dealers have the largest backlog among Detroit dealers. Delivery range for seven Chevrolet dealers was 4 to 10 months. The dealers gave no encouragement when asked if sustained production or cancellations during 1947 might not shorten the delivery period.

Of five Ford dealers called, the delivery dates ranged from 4 to 8 months with an average delivery of 7 months indicated.

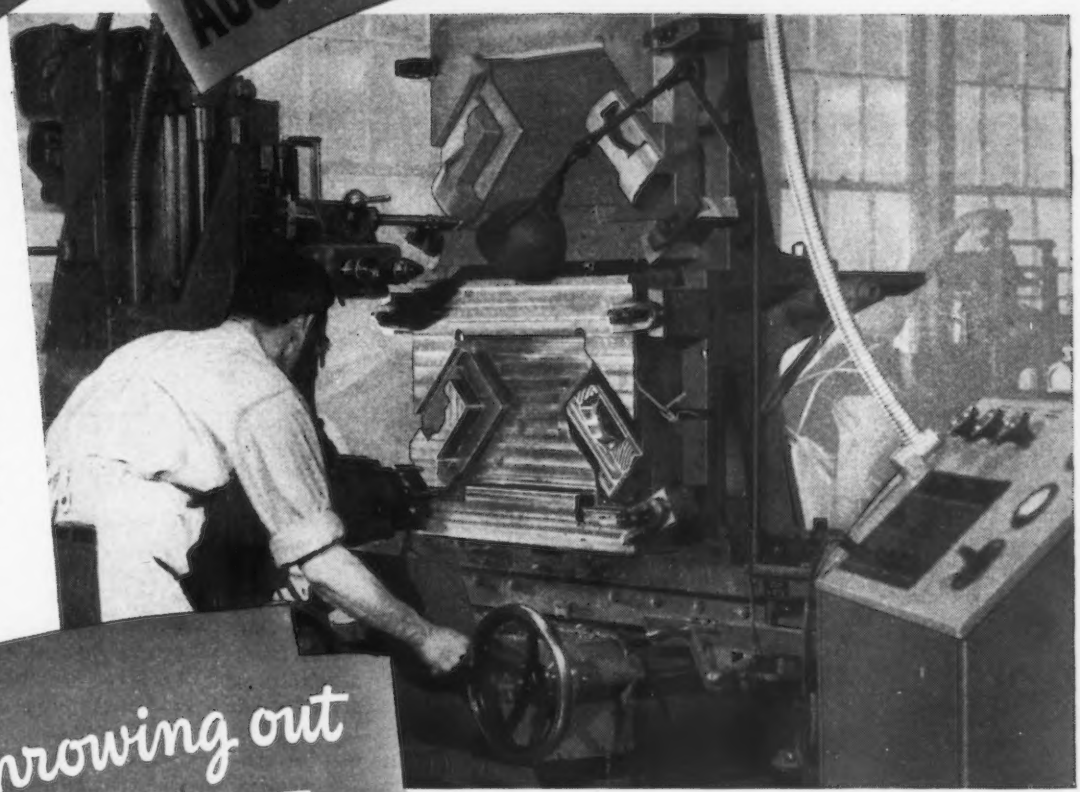
BASED on the results of the telephone survey, if Detroit dealers are anxious about prospective buyers pulling out of the market because of high prices they aren't tipping their hands. Ford, Chevrolet and Plymouth dealers in particular seem more concerned about satisfying their present customers than they are about any possible loss of customers in the future. Their attitude seems to be that a market sag is something to be faced when it occurs. This reasoning seems to apply to dealers in the low price field as well as those selling in the Dodge, Buick, Pontiac and Oldsmobile price class.

Only two calls were made on dealers selling in the Packard-Cadillac price class which was considered to be outside the scope of the present survey.

Operating on the theory that the results of telephone calls might not be representative of the new car situation, the writer also made 14 personal calls on Detroit dealers to again ask about possible delivery dates for a new car. While the results of these calls generally confirm the earlier findings, many of the individual reactions are of some interest.

The first Chevrolet dealer called

How you can meet AGGRESSIVE COMPETITION



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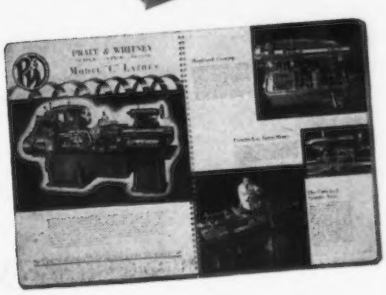

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Pratt & Whitney

Division Niles-Bement-Pond Company

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on explained that he is right now a year behind in deliveries. However, he might be able to make delivery by midsummer if continuous automobile production is maintained. He expects good business for the balance of 1947 and has not observed any change in his customers which include a representative number of factory workers. Each of his orders is backed by a $25 deposit. "An order without a deposit is worthless," he said. Much to our surprise he undertook to get our name on an order blank. He was one of two dealers out of 14 visited who asked for an order.

While scarcely typical, an experience with a Pontiac dealer is enlightening. After letting us wait in the showroom for 15 minutes, the sales manager invited us into the office, explaining that he was very busy since he employed no salesmen other than himself. He thought he could make delivery of a Pontiac in 60 to 90 days, but couldn't be certain. During the past year, he went on, he delivered personally 400 new cars and 350 used cars. While car prices are admittedly too high, he had had only one cancellation during 1946.

Incidentally, the owner of this particular dealership is in Florida where he had just flown in his personal plane with his personal pilot who also acts as a car salesman when the boss is not off on a trip some place. If we wanted to fill out an order a deposit of $100 would be required.

MORE outspoken than most was a Chevrolet dealer who admitted, "Sure, we have two lines of buyers; those who have a trade-in and those who offer a cash deal. With a trade-in we can let you have a new car in 2 to 3 months; from 5 to 6 months will be necessary if this is to be a cash deal."

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Car dealers have a black book for customers, too, it seems. A Nash dealer told about three of his customers who had agreed to a trade-in when placing their order and then begged off when they took delivery on the new car. Within a month, the dealer said, all three sold their second car. "We don't expect to sell to them again," the dealer said with some emphasis.

Based on these conversations, Detroit dealers are a reasonably polite lot and are even showing some marked signs of enterprise. The fact that new cars are being sold on used car lots for prices higher than the dealer can get for the new car irks the dealer which is quite understandable. Many dealers feel they would be happier if they had to sell cars rather than just stand around, write up orders and hold off would-be buyers. The number of cars being financed is increasing but one dealer reported he had financed only two deals out of 60 cars sold; all other transactions were for cash, he said.

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Estimates Steel Truck Bodies Consume One Ton of Steel a Body

Detroit

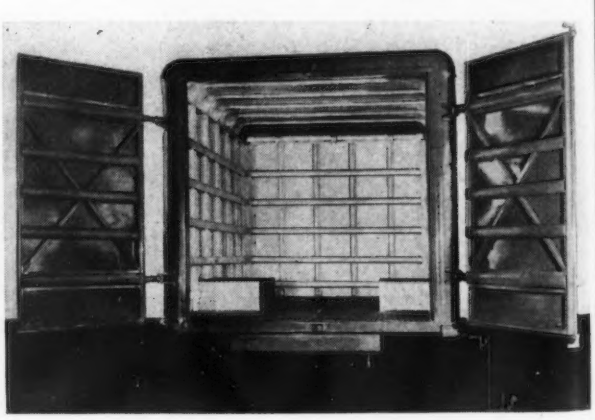
• • • It has been estimated that the construction of all-steel truck bodies by one Detroit manufacturer now consumes an estimated 5000 tons of steel annually based on a recent announcement of Oltman-O'Neill Co. of Detroit, a leading manufacturer of all-steel truck bodies.

According to L. M. Oltman, president, the company has now attained a production rate of 5000 all-steel truck bodies per year, making it the first builder of all-steel van bodies to attain this high annual rate. Each body requires on an average 2000 lb of steel, Mr. Oltman explained.

During April 1946, Oltman-O'Neill began production of all-steel, all-welded van bodies on an assembly line basis. The company is now in production on a new line of wheel house truck body models which lower the floor level and overall height by 9 in., according to Mr. Oltman. This type wheel housing, built in a modified hexagonal pattern is said to give equal clearance for truck tires whether the vehicle is loaded or light.

Oltman-O'Neill sells its all-steel bodies through established truck and truck equipment dealers, making it possible for the dealer to furnish trucks with bodies mounted and painted to match when he obtains a truck chassis order from a customer.

The van bodies are engineered according to Mr. Oltman, to fit all makes of trucks.



WIDE OPEN: *Maximum cargo space is available in this all-welded, all-steel truck body built by Oltman-O'Neill Co. of Detroit. Non-skid steel formerly used on decks of cargo vessels is specified for flooring. A specially designed wheel housing permits equal clearance for tires whether the truck is loaded or light. Rigidity is gained by "X"-bracing of steel doors.*

VEGA

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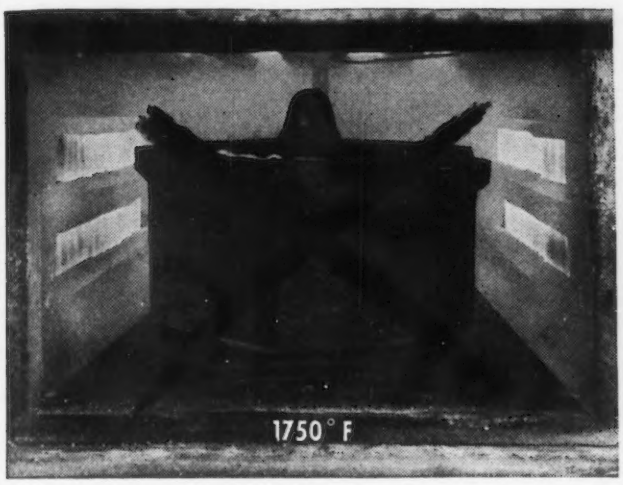

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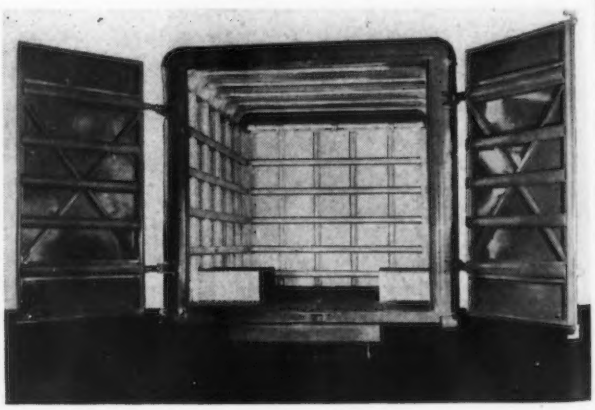
The van bodies are engineered according to Mr. Oltman, to fit all makes of trucks.



WIDE OPEN: *Maximum cargo space is available in this all-welded, all-steel truck body built by Oltman-O'Neill Co. of Detroit. Non-skid steel formerly used on decks of cargo vessels is specified for flooring. A specially designed wheel housing permits equal clearance for tires whether the truck is loaded or light. Rigidity is gained by "X"-bracing of steel doors.*

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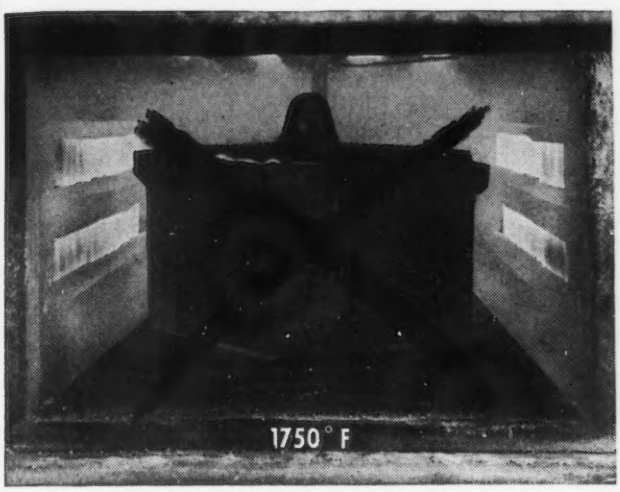

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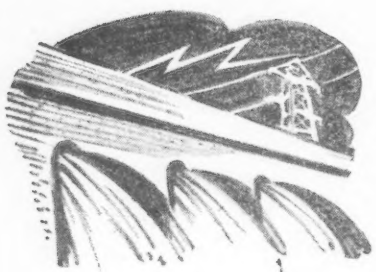
West Coast . . .

ROBERT T. REINHARDT

• California steel industry and manufacturers anticipate boom year . . . Rated capacity for Geneva reduced.



SAN FRANCISCO—The present muddle in West Coast steel prices has failed to dampen the enthusiasm of industrialists and steel producers who are keeping a watchful eye on developments in heavy construction and manufacturing which appear to indicate one of the most profitable and active years in their history.

Approval given last week by the Army-Navy board for the construction of a new low-level, 6-lane, combination trestle and tube crossing of the San Francisco Bay between this city and the East Bay area at an estimated cost of $261 million started steel fabricators doing some work with sharp pencils to determine the potential volume this structure will afford. There was some disappointment in that in all probability the structure as now proposed will involve less steel than did the present high-level bridge, but even so the tonnage involved will be the heaviest since that first bridge crossing was built.

While there is unanimity of thought as to the need for a second Bay crossing, controversy has been waged as to the location and type of structure to be built. The presently recommended location is just south of the present bridge and would connect from 26th St. in San Francisco to Alameda and cross Alameda by a freeway and connect to the Oakland mainland well south of the present structure. From San Francisco the first 3600 ft would be a trestle 15 ft above mean low water; the next 6400 ft eastward would be a tube with a minimum depth of 50 ft and a maximum of 81 ft; the next 15,000 ft would be a trestle with the easternmost 7000 ft over earth fill.

Earliest possible start of construction is estimated to be about 1949, as surveys must first be made, financial details arranged and enabling bills which are now before the California legislature must be passed.

It is the considered view of most fabricators in this area that by the time the go ahead is given on this construction steel will be in ample supply.

PLANS of the Ford Motor Co. to purchase car and truck components in California have created considerable interest among industrialists and an exhibit to be held here Feb. 17 and 18 and in Los Angeles Feb. 19 and 20 is expected to attract many manufacturers. The parts are for use in Ford's assembly plants in both Richmond and Long Beach, while a new Lincoln-Mercury plant in Los Angeles is expected to be turning out automobiles by the end of 1947.

Top Ford executives and purchasing agents will explain the buying and production policies of the company to interested manufacturers. Estimates of the potential business involved for California producers run as high as $50 million annually.

Suppliers for metal parts will be sought, including frames, bodies, wheels, bolts, nuts, gears, machined forgings, machined castings, stampings, screw machine products and assemblies.

Ford's announcement brought about many enthusiastic comments from industrialists in the state, all of whom expressed the belief that this action would set a precedent for other manufacturers and bring about a marked increase in the integration and self-sufficiency of motor car production on the West Coast. Most westerners have long been unhappy because of the necessity for importing components and assemblying them in this area.

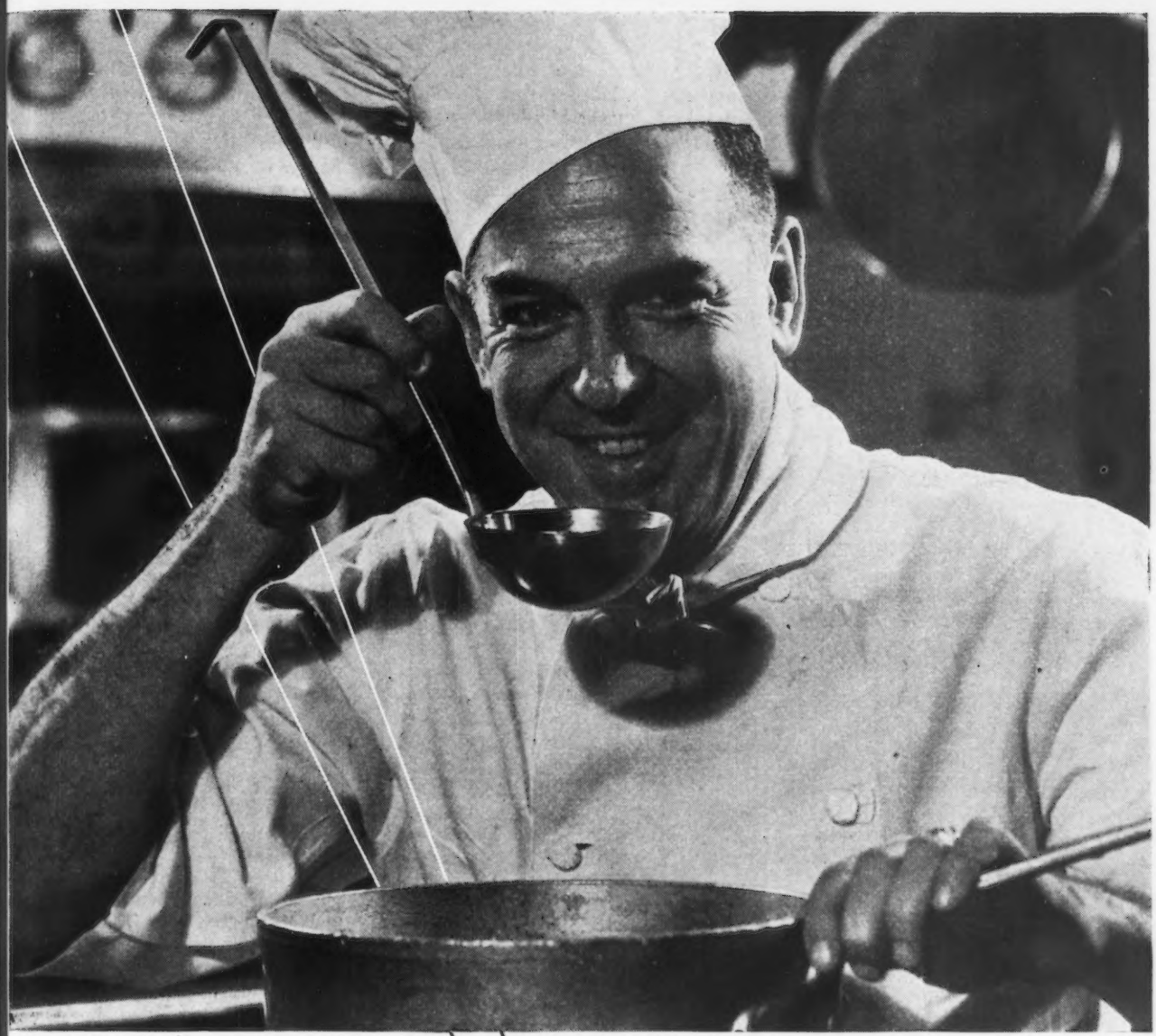
Kenneth T. Norris, president of the California Manufacturers Assn., who will soon begin turning out wheels at Los Angeles, has been active in promoting this project. He said: "This move on the part of Ford Motor Co. recognizes California's unusual growth to industrial eminence. It is the real way by which continued industrial progress and prosperity can be assured to all Californians. Production makes prosperity and only more sales can make more production."

Items now purchased from West Coast suppliers amount to more than $15 million annually. Among the major suppliers are U. S. Spring & Bumper and L. A. Young Spring & Wire Co., both of Los Angeles.

ANOTHER very favorable sign in the eyes of most industrialists is the continuing policy of the local CPA office to approve nearly a maximum percentage of nonresidential construction. Last week's approvals totaled $2,584,166, which included several building additions and new plants. This heavy construction program is placing a strain on suppliers of fabricated steel and reinforcing bars with bookings running well into the last quarter of this year for many items.

While the CPA has been approving a larger percentage of nonresidential construction in the last few months than previously, according to A. J. Grier, regional director of the CPA, controls are likely to continue at least until the first of July. He said:

"We are fully aware of the urgent necessity for industrial, commercial and institutional expansion in this area, but nonessential and deferrable construction must continue to be postponed until materials supply and demand are more evenly balanced. Removal of restrictions at this time would



Ph. D. IN PALATABILITY

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For 28 years, designers, engineers, and management at the Twin Disc Clutch Company have been accumulating unmatched experience in transmitting and controlling power. It is this experience that enables them to build *proved* clutches and hydraulic couplings for every type of industrial equipment.

This long record of successful experience explains why so many leading manufacturers of industrial equipment specify "Twin Disc" in solving their power tranismssion and control problems. They recognize that in the manufacture of clutches it's the results that count.

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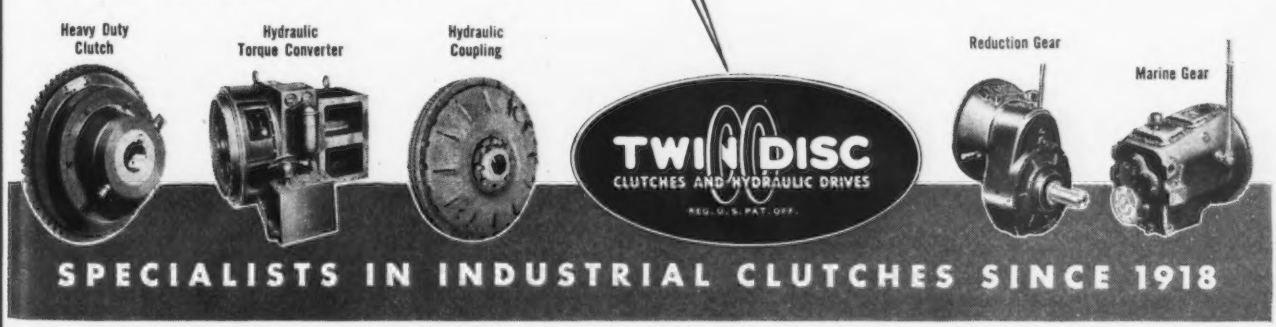

SPECIALISTS IN INDUSTRIAL CLUTCHES SINCE 1918

create an utterly chaotic condition, with competition for labor and materials disastrous alike to home building and essential nonresidential construction."

He points out that since Mar. 26, 1946, when the Veterans' Home Program went into effect, through Jan. 9, 1947, over 50,000 applications for nonhousing construction involving an estimated cost of more than $1,891 million were denied as nonessential or deferrable throughout the nation. In this region which comprises northern California, Oregon, Washington, Nevada, Idaho, Montana, Wyoming and Hawaii, denials during the same period approximated $140 million.

PACIFIC GAS & ELECTRIC CO.'S announced 5-year program involving an expenditure of approximately $300 million will provide a considerable amount of work for steel fabricators and producers of the West. This company has applied to the Federal Power Commission for a license to construct two new power houses on the Feather River and is planning increases in its transmission and distribution facilities.

Anticipating that the industrial development of the area is going to continue, James B. Black, president, reports that PG&E has spent more than $45 million in 1946 and expanded plans will reach the $300 million total within 3 years.

Approximately 1 million hp will be added to the PG&E system by the proposed expansion which will make the total by the end of 1951 more than 3.5 million hp.

The ability of PG&E to supply adequately its industrial customers in central California was challenged by Richard L. Boke, regional director of the Bureau of Reclamation at Sacramento, who last week indicated that a power shortage was developing. Among other things Mr. Boke said that the Reynolds Metals Co.'s application for power to reopen the river bank aluminum plant near Modesto had been turned down. This latter charge has been denied by A. Emory Wishon, vice-president and general manager of PG&E, who states:

"The company has not refused to serve any customer. The Reynolds Metals Co. has not been turned down in its application for power to reopen the river bank aluminum plant near Modesto, as stated by Mr. Boke. On the contrary, the company made an offer to the Reynolds Co. last October to supply this plant, but has had no reply to that offer. The offer still stands."

As a result of the survey made by the Bureau of Reclamation, Mr. Boke indicates that to assure an adequate supply of electrical power for the complete industrial development of the area, early completion of the Central Valley Project power features is necessary. It is his contention that even with the complete expansion program of PG&E added to the scheduled development of the CVP power, the situation in 1951 will be approximately as it is today without, as he says, "adequate reserves and with productive expansion restricted to the extent of new power installations."

REGARDLESS of what the future may hold, the Department of Industrial Relations has recently announced that an average of 677,200 wage and salary workers were employed in California manufacturing industries in 1946, which is the largest total for any peacetime year. That 1946 level compares with an estimated average of 417,000 in 1940, and with 1,165,500 at the peak of the war in 1943.

Foundries are among the industries still enjoying a wartime pressure and have little to worry about except pig and scrap shortages and perhaps some tightness in the coke supply since Solvay coke from Chicago is getting difficult to find.

Prime producers of steel are still extremely conscious of the scarcity of scrap, but serious production losses have not developed as was anticipated several months ago. It is true that inventories are being reduced in some instances, but there is a very optimistic attitude upon the part of buyers that with an increase in the shipbreaking activities and improved attitude upon the part of the boys who have been gathering in neighborhood scrap the crisis has been passed, and unless some unforeseen developments occur in the next few months, this year should see no serious deterrent to near 100 pct capacity production.

SALT LAKE CITY—A campaign started by the inhabitants of the government-owned coal mining town of Dragerton to induce War Assets Administration to sell the community piecemeal rather than as a single unit has been taken up by the Utah legislature. Both houses this week passed a memorial urging the governmental agency to reject all bids on the entire town and dispose of the homes singly, giving first preference to present occupants and second preference to war veterans.

The community, which includes more than 600 homes, a school, public auditorium, hospital, theater, business district and other community facilities, was built by the government at a cost of about $5 million. WAA has already put it up for sale on a single unit basis and the cutoff date is Feb. 14. Estimates of the number of bids made thus far range from 6 to 12.

The disposal plan proposed by the residents and indorsed by the legislature contemplates the sale of the business properties separately and the transfer of the public facilities to the community. The supposition is that a successful bidder on the entire community would follow the same procedure over a period of time, but of course with a handling profit.

Geneva Steel Co.'s major interest in the matter is to see that the town is maintained and enlarged to house workers at its coal mine. The level of the plant's operation during the next year will be determined by the amount of coal that can be mined and transported, and coal production will be largely determined by availability of housing facilities for workers in the area. For some time now it has been easier to get coal miners than to find shelter for them.

The theoretical rated capacity of Geneva steel plant has been reduced from approximately 1.2 million tons of ingots to 784,000 tons because the latter figure is the estimated long-term normal capacity of the usable facilities.

The U. S. Steel Corp. bid on the plant was based on the assumption that the available market would make usable two of the three blast furnaces and six of the nine open hearths, with a capacity of 784,000 tons, and this is the figure that has been filed with the American Iron & Steel Institute.

Currently the demand would permit operation of all three blast furnaces and the expectation is that the third one will be blown in as soon as coal and iron ore supplies are adequate to maintain a three-furnace operation.

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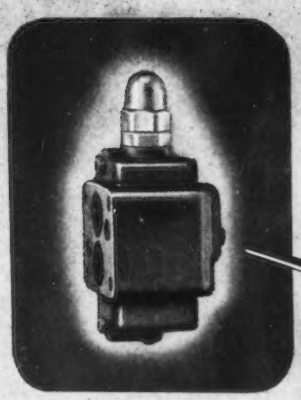
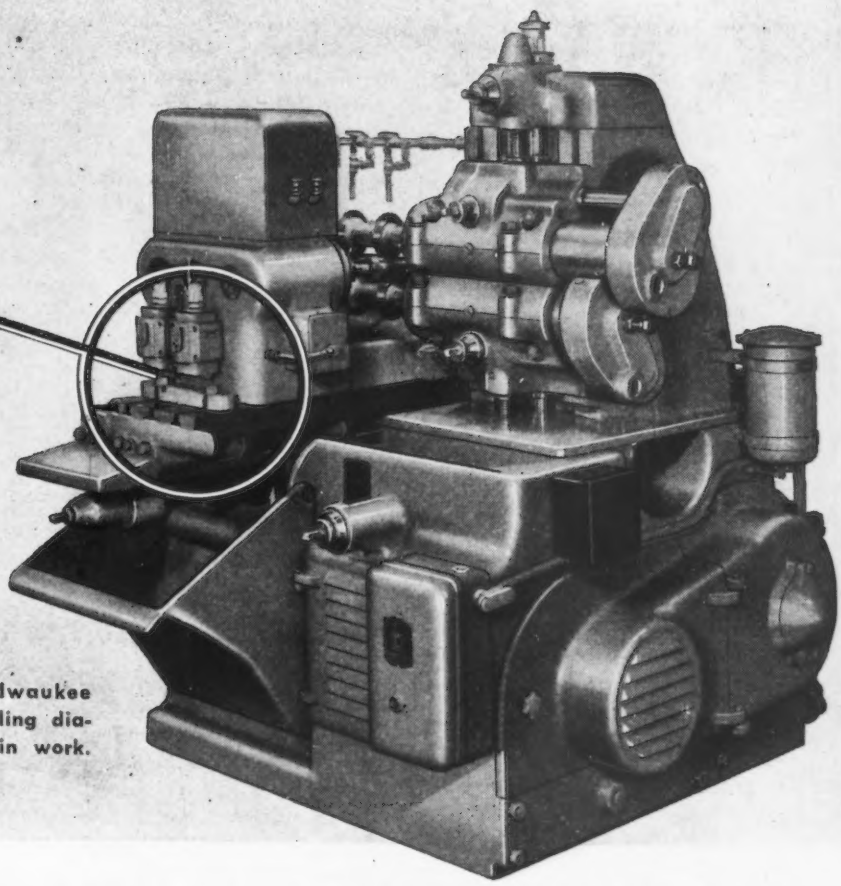


Vickers Hydraulic Sequence and Check Valve.

This is one of a series of applications pointing out the many advantages of Vickers Hydraulic Controls.



Kearney & Trecker Milwaukee Simplex for multiple milling diametrically opposite slots in work.

This is a representative installation of Vickers Hydraulic Controls featuring interlocking of machine operating phases by a combination of pilot interlocks and pressure sequence control valving. Three work arbors are indexed to position for simultaneous slot milling . . . accurate register and timing being assured by series connected pilot and pressure sequence interlocks. Thus all three pieces are in proper position before cutters approach the work. The same positive interlocking prevents succeeding automatic index until cutters are clear.

Other advantages of these valves: (1) they automatically provide "cushioned" operation, and (2) their ease of adjustment saves set up time when a variety of types of work is to be accommodated.

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New BULLETIN

Bulletin 45-34 on Vickers Pressure Control Valves includes operation, typical applications and installation of unloading, sequence, overload relief and counterbalance valves.

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ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

2346

Washington . . .

L. W. MOFFETT

• Krug makes bold suggestions for metal economy . . . Wants $1 billion survey . . . Minerals replace gold as import barter? . . . Use of St. Lawrence seaway proposed.

WASHINGTON — Reflecting the administration's anxiety over the near exhaustion of some of the nation's mineral resources, Secretary of the Interior J. A. Krug in his annual report suggests some startling means to take care of the nation's metal economy.

Discussing these subjects under the heading of "The Metal Mystery," the Secretary said it has become a mystery to most students of the problem how we can go on being the greatest metal using nation of the world when our reserves of copper, lead and zinc are all seriously overdepleted and rising in cost, and when our best iron ore, in the Mesabi range, is subject to exhaustion within another 20 years.

What would Mr. Krug do about it? A number of bold things. He does not hesitate to place the cheaper minerals above gold as a trading medium to build up the nation's metal economy. That is made clear in Mr. Krug's statement that: "There is even some thought that the barter process of the prewar decade that made gold our most valuable metal import, while the manufactured goods we exported drained our other mineral resources, should be arrested, and a new exchange sought. The suggestion has been made that our exported goods be paid for in raw materials, including minerals."

This strong statement strikingly reflects Mr. Krug's concern over the depletion of the cruder metals. By comparison the billions of dollars worth of that precious yellow metal at Fort Knox, Ky., is given a low rating. This is out of tune with the romance and wealth, wars and struggles of mankind that so often center around gold. No doubt Mr. Krug's views accord entirely with millions of people who realize the complete necessity of the cruder minerals to the national life. Gold, no longer the standard for currency values, is not even in circulation as a monetary exchange product. Its value has been reduced chiefly to use for dentistry and for making jewelry.

WHAT else would Mr. Krug do to build up mineral resources. His answer is a national survey, whose cost, estimated at $1 billion, sets a mark of about half the huge outlay for the atomic bomb research and production.

Mr. Krug said that the Geological Survey and the Bureau of Mines have worked out a series of approaches to the basic problem of assuring some continued national basis for our mineral and metal economy, the first of which is a nationwide inventory. Normally, he said, it would take 20 years to complete. It could be speeded up, however, it was pointed out. The inventory would reveal, Mr. Krug said, what we have and what it is worth.

He would know also, it was explained, the degree of our actual dependence on foreign sources, the possibilities for a continued flourishing mining industry in this country and possibly also the point at which substitutions of one mineral for another and of plastics for specific minerals can be expected to become important factors in our economy. Seeking to justify the outlay of $1 billion, Mr. Krug declared that it would underwrite petroleum and coal as well as mineral inventories. The Geological Survey, Mr. Krug said, feels reasonably optimistic that the discovery of both metallic and nonmetallic minerals will result from this work.

The new geophysical methods, where they are applicable to minerals, would also be used. The wartime use of the airborne magnetometer for finding U-boats under water, it was pointed out, is being applied to finding significant mineral deposits under land.

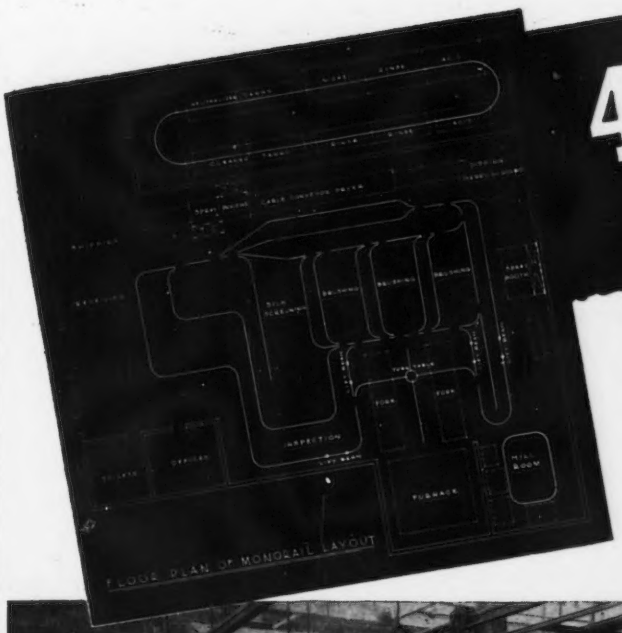
BEFORE the discovery portion of the program can get very far, the report said, there has to be more basic mapping of the geology of the nation. At present, less than 10 pct of the country has been mapped on scales adequate for the exploratory guidance now needed. It involves, the report proceeded to say, securing data on reserves which mining companies have not yet made available to the government, partly for fear of taxation of the several states which tax declared reserves in the ground rather than production only. It will also involve drill-testing of many ore bodies. Above all, the report emphasized, it involves putting cost tags on our resources and making these cost tags take into account all the possible economies that can be obtained from newer mining and processing methods and from lower cost energy.

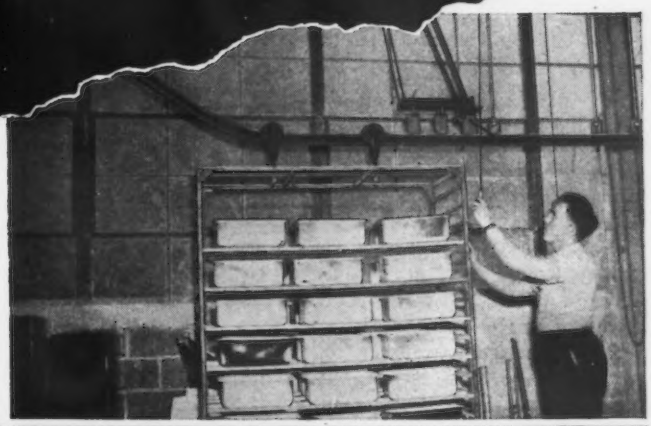
Quoting Under Secretary Oscar Chapman the report said that the Department hopes that new processes can be developed to bring into production low-grade domestic ores. Mr. Chapman said he had no desire to hasten the increase for foreign minerals except in the form of stockpiles for security purposes. These would be critical and strategic minerals. At the same time, the Under Secretary declared "we find it desirable to have sufficient foreign imports to allow our manufacturing industry to produce fully. We simply want the American mining industry to be kept operating on an economic basis as long as possible."

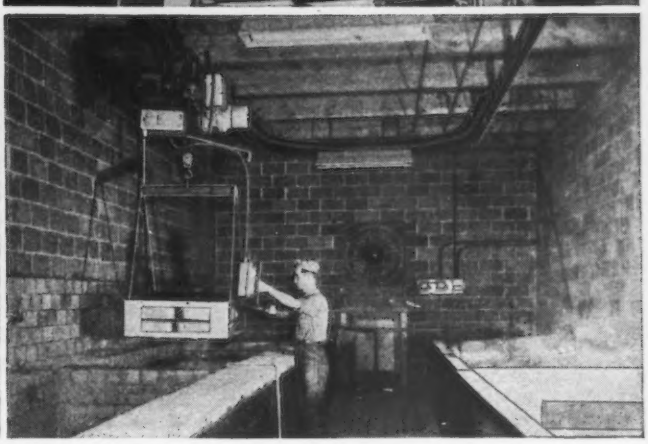
MR. CHAPMAN then brings in a highly controversial issue. He wants the St. Lawrence seaway and its power plant to be used when we go on an increased import basis. He concedes that when that is done

From Stamping to Finished Ware

48 HOURS







(Finishfotos—Courtesy Dana Chase Publications)

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American MonoRail equipment serves each operation. Flexible arrangement permits continuous and prompt flow of ware through all departments. An unusual feature is shown in top photo where a simple air device lifts racks from one level to another, permitting easier loading and unloading. In this plant, like hundreds of others, American MonoRail equipment tends to integrate entire operations.

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the whole metal fabricating industry of the lake area will unfortunately suffer a slow but profound shock. That shock, he said, will come from the preference that the coastal areas will acquire when foreign minerals are shipped to this country.

They will arrive, it was pointed out, at the coast ports from abroad, instead of coming to the lake area from the Middle West or mountain area. It was declared that the tendency will be for metal fabricating to move out of the lake area, particularly toward the East Coast, to gain the advantages of the lowest costs. Mr. Chapman added that the movement would profoundly change the character of economic activity in the lake areas.

Such a movement, he pointed out, would also put the mineral resources of the Middle West and the mountain area farther away from their markets than they now are and force a lowering of their already very thin margin of profit to an impossible point. They simply cannot afford to absorb any more freight costs, Mr. Chapman insisted. The mineral areas of the mountain area and Middle West, it was added, therefore stand to gain by any effort that will benefit the lake area. In his estimation the St. Lawrence seaway represents a stabilizing factor in the situation.

He went on to say that he would be reluctant to see developments that would shut off the middle western mining industry. He proceeded to say that the seaway with a maximum importation of 8 million tons, of which only a small part probably will be used for minerals will not result in any such shutdown. On the contrary, Mr. Chapman said it will help the western and middle western mining states to the extent that it helps keep the metal industry of the lake area just where it is now, close to the domestic source of minerals.

SECRETARY Krug says that the next and third approach to a solution of the nation's metal mystery is "somewhat more audacious." It is that of adding values to low-grade minerals by finding an entirely new use for them, much as the value to the nation of uranium was increased immeasurably when its use shifted from an ingredient in the glass and pottery industries to a source of energy. It was also pointed out that the possibility of lowering costs enough to warrant converting low-grade American manganese into the equivalent of metallurgical foreign manganese for use as ferromanganese in steelmaking is to all intents and purposes impossible.

But, it was stated, its conversion into electrolytic manganese, a new metal, with certain desirable properties of its own, is quite possible. The finding of a new use pattern is the missing part of the approach it was declared, and may be the essential requirement for the expansion of some of our nonindustrialized regions. The fourth approach was said to be congressional action authorizing continued subsidy payments to high-cost mineral producers and stockpiling for possible war needs.

The report on minerals concluded with a proposed health and safety plan for the mining personnel.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

Reveals Associations' Aid

Washington

• • • **During World War II** trade associations worked with the government to a greater degree than ever before on practically every industrial and wartime problem, according to an article which will appear in the February issue of Domestic Commerce, monthly publication of the Dept. of Commerce.

Some ways in which the more than 16,000 local, state and national associations assisted the government materially in getting the war job done were: (1) To speed and simplify manufacturing processes throughout all industry; (2) To devise new products to meet special military needs; (3) To trouble-shoot production and distribution bottlenecks; (4) To secure and maintain public support of necessary government programs.

Retains Standards Divisions

Washington

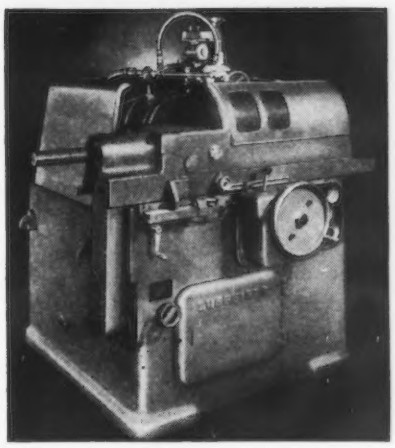
• • • **Secretary of Commerce** W. Averill Harriman has announced that the Divisions of Simplified Practice and Standards will be retained by the National Bureau of Standards. These functions at the Bureau of Standards will be under the general supervision of Dr. E. U. Condon, Director of the Bureau.

SHEFFIELD MACHINE TOOL DATA

TFG - #123-4

NEW PRECISION ANNULAR FORM GRINDER FOR CRUSHTRUE GRINDING

Sheffield announces a Precision Annular Form Grinder as an addition to its line of precision grinders. This new machine utilizes the Crushtrue principle of wheel dressing for the rapid production of cylindrical forms such as circular form tools, crusher rolls, ball bearing races and seals, shift grooves in automotive and farm implement transmission gears, and other annular forms of intricate and precise profile.



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Infinitely variable work speeds
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Wheels form dressed up to 2" face
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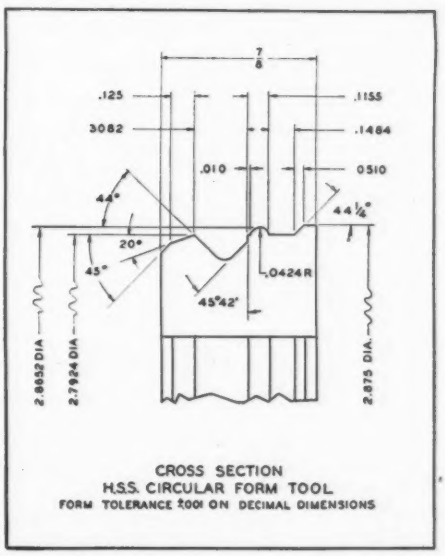
GRINDING TIME CUT FROM 4½ HOURS TO 4 MINUTES

This circular tool has a contour involving a blend of radii, straight sides, angles and flats. Prior to using the Crushtrued full form wheel, the work had been made on universal cylindrical grinders by toolroom procedure in lots of 15 to 30, and the grinding time of 4½ to 5 hours per tool was considered top performance.

A master Crushtrue Roll, made on the Micro-Form Grinder, was used to true the wheel on the Precision Annular Form Grinder shown above.

Grinding from the solid required 13 minutes. Grinding on preformed stock having approximately .020" on a side required less than four minutes.

The time required to make the Crushtrue roll compares with that of making the circular tool by conventional means. Therefore, the crush grinding process would show savings that become phenomenal as the quantities increase.



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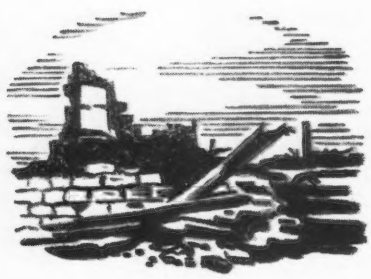
European Letter . . . .

JACK R. HIGHT

• First signs of serious labor unrest crop up in postwar Germany . . . Trouble hits coal pits . . . Optimistic view remains a purely relative matter.



DUSSELDORF — The first signs of serious labor unrest in postwar Germany have cropped up recently in the worst possible spot. Coal miners in at least 12 pits went out in a short-lived strike that frightened industrialists all over Western Europe who depend on exports of coal from the Ruhr for their operations. The strike was a poor reminder of the fact that in consideration of the essential need for their labor, miners as a group are now living better than any other working group in the Ruhr.

The extra rations which are issued to miners are beginning to be reflected in increased average weights for the miners, and the first shipments of special consumer's goods are under way. Up until this strike the coal production picture in the Ruhr had been a gradually improving one since the beginning of the year. The daily output average was up a few thousand tons per day, and coal allocation authorities were taking a generally optimistic view of the situation.

A "generally optimistic" view, however, is a purely relative matter. What the officials mean by such a statement is that the situation is slightly less foreboding than it was a few weeks ago, but that coal production is still far below demand. There is no definitely established long-term plan that fixes allocations of Ruhr coal for 1947, but British Military Government officials running the steel industry here in the Ruhr feel certain that shipments to the steel industry will be far below what has been requested as the "minimum requirements."

A tentative production program for the British Zone steel industry for the year called for 4.5 million tons of ingots and castings production, but this goal has already been given up as the coal allocation to the industry for the first quarter was cut in January, and with delivery delays will hold production far below the 4.5 rate. There is little if any possibility of making up later in the year for the first quarter losses as limitations of transport and the shortage of labor will become controlling factors on production during any period when the 4.5 annual rate is reached.

ALTHOUGH military government officials connected with steel are attempting to assure supplies for the industry, as additional authority in the zone is handed over to the German authorities political factors become more important in allocations of raw materials. Thus, the required allocations may never be made for the coal, quite irrespective of whether the coal is actually forthcoming from the mines. To summarize the fuel situation for the German steel industry, it may be said that every ton of steel below 4.5 million metric tons that is missing will be attributable directly to the shortage of solid fuels. Educated guesses are that 3.5 million tons will be about right.

In the Luxemburg industry, everything required for an output equal to the 1938 level is available except coal, which should historically be coming from the Ruhr. The industry operated at 45-50 pct of this level during 1946, and it seems likely now that any change in Luxemburgian production for the year can only be for the worse. Due to increasingly chary distribution of Ruhr exports, and successively smaller export allocations, January production in Luxemburg is below December levels. Of 35 blast furnaces in existence prewar, 10 were in production a year ago, 15 in September 1946, and 12 at the end of the year.

With a 1938 production of 2.4 million metric tons and a total of 1.2 million for 1946, present indications are that 1947 output will drop to about a million tons due to a reduction in coal supplies.

In France, although domestic coal production remains above prewar levels, the steel industry is still short of the high grade coking coals which it has always received from the Ruhr. In 1946 coke imports reached about a million metric tons, about 50 pct of the prewar average, while total coal imports were slightly less than half of 1938.

The situation may be improved somewhat late in the year as American exports, which made an important contribution to French needs last year, may in the second half include more metallurgical grades. Although French sources are anxious to obtain these grades, almost none is available in the U. S. for shipment at present.

The situation with regard to exports from the Ruhr to France is still the subject of some ill-will between France and the United Kingdom. The subject was considered of such gravity the then French Premier, Leon Blum, made a special trip to London to try to extract a promise of increased allocations from the Ruhr from the British Prime Minister.

The result of this conference, as far as the coal situation was concerned was less than satisfactory to either party. Mr. Blum left France with the intention of getting as much coal as possible with priority stamped on each car. British authorities handling the allocations on the other hand preferred not to promise future export deliveries in the face of the uncertain production situation in the Ruhr.

AT THE conference Mr. Blum was informed that nothing could be done to resume exports at the November level from which they were drastically cut until April, but

at that time the cuts would be restored. The original implication of the reductions effected last year was that they would be necessary for a period of six months, but a bitterly cold winter has put the entire European fuel picture in a gloomy state.

In the shortage period following the end of the war the U. S. has emerged in a strange role as the most important exporter of coal. The program for 1946 was for the export of 2 million tons per month, but coal and shipping strikes reduced the figure considerably. Shipments during January (final figures not available at this writing) probably totaled 1.8 million tons, and some authorities are now dreaming in terms of 3 million tons per month for late this year, although this figure is probably optimistic.

The foreboding of another coal strike in April, and consequent stockpiling in the United States, plus the limitations of existing port facilities and freight cars are the controlling factors on American shipments. Generally speaking port facilities are working at a near capacity rate, although a broader long range planning of shipping tonnage might possibly improve this situation somewhat. The principal prewar coal port, Hampton Roads, is virtually unused at present, as most of the coal is coming from other areas.

IF COAL production does not suffer too heavily from another strike, increased availability in the mines in this region would offer the possibility of utilizing existing facilities at Hampton Roads.

As credits granted by the United States during the past year are used, the European dollar shortage is apt to put a practical limit on the total amount of aid that the United States can lend to the coal famine. Italian reconstruction, which has relied heavily on American coal supplied by UNRRA will suffer after Apr. 1 unless an increased supply of dollars is available for purchases after this date.

Just exactly how great a tonnage of steel will be lost in Italy during 1947 due to the shortage of fuel is impossible to estimate until it is known if imports from the U. S. will continue after the first quarter of the year.

A recent official statement by the British Iron & Steel Federation indicated that the United Kingdom lost a half million tons of raw steel output during 1946 due to the coal shortage. The same situation, if not worse, seems likely to prevail during 1947. Outputs are generally being cut this month due to recent cuts in coal allocations, which may last for several weeks. The severe winter in England has been far worse than average, to further embarrass the government.

OFLC Holds a Special Surplus Sale in Britain Of U.S. War Vessels

Paris

• • • **Active demand** for surplus U. S. war vessels to aid in the rehabilitation of Europe's inland water transportation system was reflected in a complete sell-out by the Office of the Foreign Liquidation Commissioner of 344 auxiliary vessels and landing craft in a special United Kingdom offering. These craft were remnants of the invasion fleet lend-leased to the British during the war, and represented a total cost of $81 million to the United States.

Although most European governments figure prominently in these purchases, a large number of vessels were awarded to individuals and commercial firms, and reconversion plans are already under way to adapt the craft for cargo and passenger transportation. For instance, LCM's, a military craft for landing mechanized units on assault beaches, have been successfully converted for use as river tugs, and Poland has purchased a small fleet of them to reopen her inland waterways traffic.

Designed strictly for war service, all of these surplus vessels were veterans of hard years of operational duty, and many of them were offered for sale on a scrap and salvage basis. The sale of vessels in the U. K. netted $5,666,000 and brought to over $35 million the total return to U. S. taxpayers from surplus ships in Europe.

The Maritime branch of OFLC is preparing invitations to bid for tugs and landing craft in the Mediterranean, which will be followed by an offering of vessels located at Bremerhaven, Germany. Plans also will soon be announced for the disposal of a sizable fleet of American lend-lease minesweepers still engaged in clearing North Sea and Mediterranean waters.

GI DRILLER: *An American Army private stationed with the occupation forces studies the rudiments of drill press operation in the Bremen area high school metalworking shop under the supervision of a German instructor.*

PERSONALS

o o o

• **Bennett S. Chapple, Jr.** has been made assistant vice-president of sales, U. S. Steel Corp. of Delaware, Pittsburgh. Mr. Chapple had served in various capacities with the American Rolling Mill Co. until 1936, when he joined the sales department of Carnegie-Illinois Steel Corp. as manager of sales promotion. He subsequently served as assistant to vice-president in charge of emergency defense coordination and as assistant manager of sales, New York district sales office of Carnegie-Illinois. In 1944 Mr. Chapple resigned to become assistant to the president of the Firth Sterling Steel Co. In 1945 he joined the staff of the vice-president in charge of sales, U. S. Steel Corp. of Delaware.

• **Hubert Merryweather,** general manager of ore properties, Bethlehem Steel Co., Bethlehem, Pa., has retired. He has been with Bethlehem Steel for 36 years.

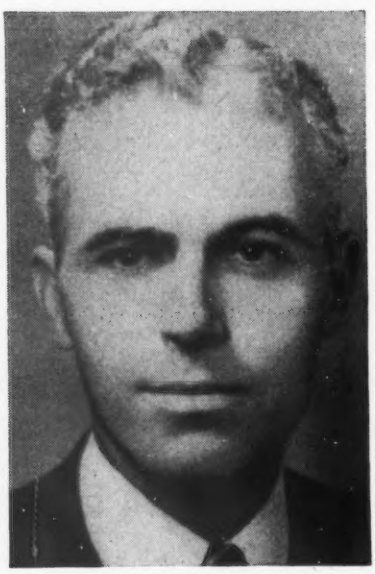
• **Herbert V. Evans, Jr.** and **H. C. Grieme** have joined the sales department of Alloy Steel Products Co., Linden, N. J. Mr. Evans began his career in the steel industry with Lebanon Steel Foundry. After his return from service in the Army Air Forces he represented Anticorrosive Metal Products Co. Inc., in New England. Mr. Grieme, with Bureau of Ships, USN, during the war, previously was engaged in purchasing work with Chemical Construction Corp. and H. K. Ferguson Co.

• **Paul H. Fox** has been appointed assistant general sales manager of the aluminum division, Reynolds Metals Co., with headquarters in Louisville. Prior to the appointment Mr. Fox was Reynolds divisional manager for the central states area with headquarters in Chicago.

• **G. Edward Pendray** has been appointed counsel in public relations for Crucible Steel Co. of America, New York.

• **Gerald E. Rhodes** has been appointed assistant manager of the Gary, Ind. plant of American Bridge Co., U. S. Steel Corp. subsidiary. Mr. Rhodes joined the company in 1931 and served as assistant to the manager since 1943. He succeeds **Jay K. Thompson** who has retired after 44 years with the organization.

• **Alfred G. Finlay** has been named manager of stainless steel division of the general sales department, U. S. Steel Supply Co., Chicago, a U. S. Steel subsidiary. Mr. Finlay has been associated with the company since 1935. Since 1943 he has been a salesman in the general sales department of the company, which position he held until his present appointment.



WILLIAM T. GOSSETT, vice-president and general counsel, Ford Motor Co.

• **William T. Gossett,** member of the law firm of Hughes, Hubbard and Ewing, has joined the Ford Motor Co., Dearborn, Mich., as vice-president and general counsel. Mr. Gossett will direct all the legal affairs of the Ford Motor Co. commencing Mar. 15. **Charles J. Fellrath,** who has been with the company since November 1945, will be assistant to Mr. Gossett.

• **Frank B. Powers** has joined the Baldwin Locomotive Works, Philadelphia, as assistant to vice-president in charge of operations. He was engineering manager, transportation and generator division of Westinghouse until 1945 and later executive vice-president of the Great American Industries.

• **A. C. Ditz** and **E. W. Norman** have been appointed assistant general sales managers of Pontiac Motor Div., Pontiac, Mich. Both are veteran sales executives of the division.

• **William M. Bausch** has been appointed Pittsburgh district sales manager of the Follansbee Steel Corp. He joined Follansbee in 1923 and has held a number of executive positions including assistant district sales manager in Cleveland and district sales manager in the Chicago area. During the last 5 years he has been manager of orders in the Pittsburgh office. **Freeman J. Hoffman** succeeds Mr. Bausch as manager of orders. Until this promotion he was assistant manager of orders. **S. C. Goodnough** has been named assistant manager of orders. Both Mr. Hoffman and Mr. Goodnough have been with Follansbee for a number of years.

• **Otto W. Winter** has been elected to the position of president and general manager of Acme Pattern & Machine Co. of Buffalo. Mr. Winter is also president of the Idea Development Corp.

• **O. B. J. Fraser** has been appointed assistant manager of the development and research division of the International Nickel Co., New York. He succeeds H. J. French, who recently was made assistant vice-president of the company. For the past 13 years Mr. Fraser has been director of technical service on International Nickel's mill products, and since March 1945, he has also headed the industrial chemicals section of the development and research division in New York. He joined the company in 1917.

• **Dr. Wadley R. Glenn** and **R. S. Lynch** have been elected to the board of directors of the Atlantic Steel Co., Atlanta. **Charles F. Stone** has been elected chairman of the board; **R. S. Lynch,** president; **W. R. Glenn,** vice-president; **H. B. Johnson,** vice-president; **Gilbert Purvis,** treasurer; **J. N. Goddard,** secretary; and **M. C. Sarran,** assistant secretary.

• **Douglas C. Yoder** and **Edmund H. Kanzenbaugh** have been elected directors of the Yoder Co., Cleveland. **Frank R. Sergeant,** formerly assistant secretary-treasurer, has been reelected director and also promoted to secretary-treasurer to fill the vacancy caused by the recent retirement of **Harvey O. Yoder. James Dalgleish,** who has been chief auditor for 11 years, has been made assistant secretary-treasurer.

• **Harvey T. Gracely** has been elected president and general manager of Marion Power Shovel Co., Marion, Ohio. Mr. Gracely was elected a member of the board of directors in 1944 and a year later was made vice-president.

• **Stuart L. Parsons** has been appointed chief engineer for the tungsten and chemicals division of Sylvania Electric Products Inc. at Towanda, Pa. He joined the company's physical research department in 1939.

• **Howard W. Dunbar,** vice-president and general manager of the grinding machine division of the Norton Co., Worcester, Mass., has retired. He came to Norton in 1913 as assistant chief engineer. Mr. Dunbar will be retained by the company as a consultant and will act in an advisory capacity. **Everett M. Hicks** has been appointed assistant manager of the grinding machine division by Norton Co. He entered the employ of the company in 1937 on the controller's staff advancing to the positions of chief cost accountant and assistant controller.

• **Reber C. Stupp** has been elected a vice-president and director of Jack & Heintz Precision Industries, Inc., Cleveland. Mr. Stupp, who is to be production manager at Jack & Heintz Precision Industries, has been with the Delco Products Div. of General Motors Corp. since 1922 and for the past 4 years has been plants manager in the three Dayton and two Cincinnati plants. **Joseph E. Rogers,** president of Addressograph-Multigraph Corp. until his retirement last year, has been elected a director and member of the executive committee of Jack & Heintz Precision Industries.

• **H. A. Cammann** has been named general manager of the Commercial Steel & Boiler Works of Seattle. Mr. Cammann was formerly associated with the Winslow Marine Ry. & Shipbuilding Co. and the Northwest Ship Repair Co.

• **Joseph R. Mares** has been appointed general manager of the Texas Div. of the Monsanto Chemical Co., and will make his headquarters at Texas City. He has been director of Monsanto's development department since 1943.

JOSEPH J. STRACHAN, general staff manager of sales, Carnegie-Illinois Steel Corp.

• **Joseph J. Strachan** has been appointed general staff manager in charge of sales of Carnegie-Illinois Steel Corp., Pittsburgh, U. S. Steel subsidiary. Mr. Strachan came to Carnegie-Illinois in 1940 from Congoleum-Nairn as assistant to the chief engineer. A year later he was made assistant to president, the position he held at the time of his present appointment.

• **M. C. Patton** has been named vice-president and assistant general manager of the Armco Drainage & Metal Products, Inc., Middletown, Ohio. He joined Armco in 1926 as an engineer with the Armco Culvert Manufacturers Assn. He has been assistant general manager and a member of the board of directors since 1945.

• **Alexander L. Feild** has been appointed associate director of research laboratories of the American Rolling Mill Co. of Middletown, Ohio. Mr. Feild, who had been director of research laboratories of the Rustless Iron & Steel Corp. prior to that company's entrance into the Armco organization, will be in charge of research on wire, bar and flat-rolled stainless steel products.

• **Roland E. Nelson** has been appointed manager of the Chicago office of the H. K. Porter Co., Inc. For the past year, he has been sales engineer serving the St. Louis territory.

• **Holmes Brown** has been named director of public relations of the American Locomotive Co., New York, succeeding **Lynn Mahan,** who has resigned to form his own public relations organization. Mr. Brown has been associated with American Locomotive since 1945, when he became director of advertising and sales promotion. **George Mason** has been appointed assistant director of public relations. He is also director of information. He joined American Locomotive in 1945 after 3 years of service with the Army Air Forces.

• **Herbert M. Hodges** has retired as overseas director of the Monsanto Chemical Co., St. Louis. Before becoming overseas director, Mr. Hodges served as director of the foreign department of the company from 1941 until 1945, when he undertook a special mission for Monsanto to China, India, South Africa, Malaya, the East Indies and Australia.

• **Edwin T. Jackman** has been named manager of the bar steel division of Charles G. Stevens Co., Chicago. Mr. Jackman was formerly Chicago district manager for the Firth-Sterling Steel Co.

• **G. A. Morison** has retired as vice-chairman of the board of Bucyrus-Erie Co., South Milwaukee, Wis.

• **George B. McMeans** has been appointed assistant general superintendent of the Fontana, Calif. steel plant of Kaiser Co., Inc. Mr. McMeans was formerly manufacturing manager of the openhearth and hot mills for John A. Roebling's Sons Co.

• **Oren W. Sharples** has been appointed direct factory representative in the states of Ohio and Indiana for the Continental Screw Co., New Bedford, Mass. He replaces **Kenneth R. Corson** who on his return from the service has been assigned an eastern territory.

• **Howard Goodman,** for the last several years vice-president of the Varcum Chemical Corp., has joined General Abrasive Co., Inc., Niagara Falls, N. Y., and will have charge of sales. He will commence his work on Mar. 1. Mr. Goodman will succeed **A. J. Sandorff,** who has resigned to join A. P. de Sanno & Sons, Inc.

• **Arthur W. Farmer** has been named general traffic manager of the General Electric Co., Schenectady. Mr. Farmer, who had been office manager of the GE traffic division, replaces **Charles E. Mochrie**, who has retired after having been associated with the company for nearly 35 years.

• **Clarence H. Hopper** has been promoted to production manager in charge of all production departments at the Philadelphia plant of ACF-Brill Motors Co. He formerly was general superintendent.

• **C. H. Menge**, industrial relations manager for Murray Corp. of America, Detroit, has been promoted to general sales manager. **F. E. McGary** becomes operations manager, and **G. S. Moore** has been promoted to industrial relations manager.

• **Fred J. Limback** has been named administrative assistant and general auditor of GMC Truck & Coach Div. of General Motors Corp., Pontiac, Mich. **Carl J. Bock** has been named chief engineer, succeeding **C. O. Ball**, who is retiring, and **William F. Maybury** becomes divisional comptroller, replacing **D. L. Tate**, who retires after 21 years of service with GMC.

• **Laurens H. Fritz** has been appointed industrial advertising manager of Sun Oil Co., Philadelphia. Formerly with Aitkin-Kynett Co., Philadelphia, he succeeds **John C. Fairchild**, who has resigned.

W. H. WILLIAMS, whose appointment as chairman of the board, Clark Controller Co., was announced in the Jan. 30 issue.

• **John H. Schneider**, former major in the U. S. Army Air Force, has joined the sales service staff of the special chemicals division of the Pennsylvania Salt Mfg. Co., Philadelphia.

• **Francis J. Kennerley** has been elected to the board of directors of Hercules Powder Co., Wilmington, Del. Mr. Kennerley, treasurer of the company since 1943, will continue to serve in that capacity.

• **Harvey F. Berghaus** has been elected to the board of directors and named vice-president of manufacturing, American Coach & Body Co., Cleveland. He will continue his present duties as assistant secretary of the company.

• **James A. MacMillan**, treasurer, has been promoted to position of executive vice-president, Geometric Stamping Co., Cleveland, subsidiary of Barium Steel Corp. He has been associated with Geometric since 1930 as controller, secretary and treasurer and vice-president and treasurer. Mr. MacMillan will retain the position of treasurer.

• **Hubert Royer** has been appointed sales manager of the chemical stoneware division of the U. S. Stoneware Co. and will be located in the New York office. He comes to U. S. Stoneware from General Ceramics & Steatite Corp.

• **Charles E. Love** has been appointed general sales manager of International Business Machines Corp., New York. He was previously sales manager for its western district.

• **E. R. Bisard** has been promoted to the position of purchasing agent for the Renown Stove Co., Owosso, Mich. He has been with Renown since 1936.

• **Frank J. Bennett** has been appointed administrative assistant of Federal-Mogul Corp., Detroit. Mr. Bennett's activities will include market surveys, standardization of operations and work with the engineering and sales departments of the company.

• **T. C. Ballou** has been appointed manager of welded products sales of American Car & Foundry Co., New York. He became associated with ACF in 1936 as sales agent in the Cleveland office.

...OBITUARY...

• **George A. Bryant**, 53, traffic manager for McWane Cast Iron Pipe Co., Birmingham, Ala., died Jan. 26 following an illness of several weeks.

• **John W. Logan**, recently retired as secretary and treasurer of Alan Wood Steel Co., Conshohocken, Pa., died Jan. 28. He became connected with the Alan Wood Steel Co. in 1904 in the operating department and was connected with that company continuously until his retirement.

• **William N. Cole**, 65, assistant superintendent for the Pullman-Standard Car Mfg. Co., Worcester, Mass., died Jan. 29.

• **Norman J. Hittinger**, 47, manager of public relations, Bethlehem Steel Co., Bethlehem, Pa., since 1942, died Feb. 2. Mr. Hittinger had been with Bethlehem Steel since 1925.

• **Alexander A. Motherwell**, 84, died Feb. 2. Mr. Motherwell was associated with General Motors Corp. for 21 years, joining the Buick Div. in 1907. Later he became general manager of the Central Forge Co. In 1936 he was made superintendent of operations of the Detroit Forging Co.

• **John H. Taylor**, 73, member of Bethlehem Steel Co.'s Buffalo plant, died Jan. 26.

• **Robert G. Scott**, vice-president and director of the Revere Copper & Brass Co., New York, died recently.

• **H. N. Radford**, 59, service manager of the Austin Motor Co., Ltd., Longbridge Works, Birmingham, England, for the past 26 years, died recently. Early in his career Mr. Radford was a designer with the Cadillac Co.

• **James Laurie**, 66, owner of Jefferson Bronze & Aluminum Foundry, Salem, Mass., died Jan. 27.

Extreme Precision

Photograph courtesy HYTRON RADIO AND ELECTRONICS CORPORATION

The extreme precision required in the manufacture of radio tube components demands exacting control. The most modern inspection methods must be used.

Jones & Lamson Optical Comparators are used to measure the dimensions and orientations of the punched holes in radio tube micas to tolerances of .0001", easily and rapidly. Many other components are also inspected by this method — plates, shields, leads, cathode sleeves, radiators, grids, and filament springs.

By any other method, inspection would be a slow and tedious business and the inspection department a costly bottleneck.

Our engineers are inspection specialists, their knowledge of holding fixtures, handling methods and suitable Comparator equipment has saved thousands of dollars in manufacturing plants throughout the country. Call, write or wire for their service today.

Probably a Jones & Lamson Optical Comparator could effect comparable savings for you. Write for our book, "Beyond a Shadow of a Doubt." Or, better still, ask for one of our inspection engineers to call and discuss your inspection problems.

JONES & LAMSON
MACHINE COMPANY
Springfield, Vermont, U.S.A.

Manufacturer of: Universal Turret Lathes • Fay Automatic Lathes • Automatic Double-End Milling and Centering Machines • Automatic Thread Grinders • Optical Comparators • Automatic Opening Threading Dies and Chasers • Ground Thread Flat Rolling Dies.

Dear Editor:

MORE ON "NEWHOFT"

Sir:

In connection with a letter published under the heading "Newhoft" in the Jan. 2 issue on the "Dear Editor" page, you are inviting comments on the possible meaning of the word Newhoft contained in a cable from China... It seems to me that the term "steel wire rod" which is uncommon in American terminology is a direct translation of the German Stahl-Draht-Stift. Stretching the imagination as much as the author of the letter to the Editor did, I would guess, therefore, that the cable refers to a special gage for wire rods known as Westfaelische Stiftdrahtlehre (Westfalian wire rod gage). It is used in Westfalia, Germany, for measuring wire rods. The letter W in the word Newhoft could mean Westfalia, while hoft could be a distortion of stift, the German word for rod. A Westfalia wire rod gage No. 5 has a diameter of 0.88 mm, that is a dimension between Brown & Sharpe gages No. 19 and 20. Assuming, further, that Ne stands for nearly, the cable could mean: Nearly Westfalia wire rod gage No. 5.

But it may all be wrong!

DR. M. KRONENBERG
Research Dept.
Cincinnati Milling Machine Co.
Cincinnati

● Your interpretation of Newhoft, Dr. Kronenberg, sounds as likely as any we've heard to date. And judging from some of the weird expressions that are being found in cables from abroad, Newhoft might mean anything. We are forwarding your comments to the reader who originated the inquiry.—Ed.

CALORIZING PROCESS

Sir:

. . . We are interested in knowing more about the so called calorizing process, which consists of diffusing aluminum into steel. We would be very grateful for any information or literature you could furnish on the subject . . .

MANUEL TAMA
Vice President
Ajax Engineering Corp.
Trenton, N. J.

● The calorizing process was discussed in the article, "Calorizing Process Is Improved," The Iron Age, Oct. 24, 1935. Further data on the process is given on p. 1082 of the 1939 edition of the "Metals Handbook," published by ASM.—Ed.

HELIARC WELDING

Sir:

We understand that a welding process, named Heliarc, has been developed for the express purpose of welding very light gages of stainless steel. Undoubtedly you possess information on this process, which we would appreciate receiving.

W. A. GREG
Design and Development Engineer
Rotary Wing Div.
Parsons Industries, Inc.
Traverse City, Mich.

● Tear sheets of articles which we have published, entitled "Helium Shielded Arc Welding" and "Gas and Heliarc Welding of Magnesium Alloys," describing the process, have been sent to you.—Ed.

REROLLED PLATE

Sir:

We will thank you to advise us if it is possible for us to get approximately 1000 tons of new steel plate rerolled. . . . A large quantity of the plate, most of which was fabricated, we are cutting down into small pieces, which we would like to have rerolled. We do not think that the large steel mills will entertain this but there should be some smaller ones that could do so. We also have 150 tons of 1⅝-in. hex. cold-rolled steel and 200 tons of 27/32-in. round steel which we would like to get rerolled. We will appreciate your giving us the names of the various rolling mills in the South and North.

MEYER SCHWARTZ
Miami Iron & Metal Co.
Miami, Fla.

● Names of steel mills in both the North and South, which we believe, are in a position to reroll plate are being sent.—Ed.

AUSTEMPERING BUMPERS

Sir:

We noticed a reference in "Newsfront" of the Sept. 19 issue relating to heat treating long one-piece automobile bumpers by austempering in a salt bath... It would be appreciated if you could tell us the source of the above, information.

A. GRANIK
Chief Chemist and Metallurgist
General Motors of Canada, Ltd.
Oshawa, Ont.

● The company referred to is Standard Steel Spring Co., of Coraopolis, Pa., and Newton Falls, Ohio.—Ed.

GLUED SHEET METAL

Sir:

We wish to obtain a reprint of the article, "Strength of Glued Sheet Metal: Redux Process" by N. A. de Bruyne, which appeared in the Aug. 24, 1944, issue.

PAUL KNAPP
Owens-Corning Fiberglas Corp.
Newark, Ohio

● We are pleased to furnish tear sheets of the article.—Ed.

NICKEL PLATING

Sir:

We would like to obtain additional information on the topic of immersion plating of nickel as developed by Abner Brenner of the Bureau of Standards, as mentioned on p. 164 of the Jan. 2 issue.

ROBERT NOLAND
Argonne National Laboratory
Chicago

● Mr. Brenner who can be reached at the National Bureau of Standards, Washington, D. C., can provide the information you are seeking.—Ed.

PLANT LAYOUT

Sir:

We are at present engaged in reorganizing our facilities at the Toledo division and the engineers in charge of this project have requested for their study any information pertinent to plant-layout which may have appeared in your publication in recent issues. . . .

J. K. RECTOR
Assistant Advertising Manager
E. W. Bliss Co.
Detroit

● We are sending copies of "Planning a Plant Layout" which we published in the Dec. 19 issue, also "Setting Up for a New Product" appearing in the Nov. 7 issue and other material which may be of interest to you.—Ed.

ATMOSPHERE PRODUCER

Sir:

Will you kindly send a reprint of the article "A New Heat Treating Atmosphere Producer," appearing on p. 48 of the Nov. 21 issue?

I. A. PAINCHAUD
Salem Engineering Co.
Salem, Ohio

● Tear sheets are being mailed.—Ed.

TOOL STEEL DIRECTORY

Sir:

Please send me three dozen copies of your latest issue of the "Directory of Tool Steels."

H. J. ALVERSON, JR.
Works Accountant
Firth Sterling Steel Co.
McKeesport, Pa.

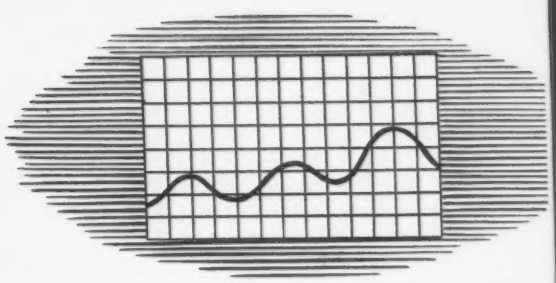
● The latest edition of the "Directory of Tool Steels" which covers tool, metal-cutting and die steels and sintered carbides, is available to readers at the following prices: $1 for a single copy, $1.50 for two copies, $2 for three copies, and 50¢ each for five or more copies.—Ed.

WELDING PROBLEMS

Sir:

We read with interest the article in the Nov. 28 issue entitled, "Welding Engineers Stress Metallurgical Aspects." If you have reprints of this article available will you please forward us four copies?

JOHN W. NORDSTROM
Technical Advisor
Associated Engineers, Inc.
Fort Wayne, Ind.



CLEARING PRECISION
Whips this Severe Test

In the illustration at left is remarkable evidence of the precision built into every Clearing press. Although multiple dies are quite common in a single action press, it is unusual to see more than one draw die in a double action press. The Clearing double action, four point suspension press pictured here has three. At every stroke, this press performs simultaneously the first and second draws on a washing machine tub, and the second draw on the spinner.

To accomplish this, the blankholder or outer slide of the press is actually used in drawing the tub. The rigidity required for the accurate three-die draw is ensured by the Clearing one-piece welded frame, and by the long adjustable guide gibs which keep slides and bed constantly parallel.

Here's one more piece of evidence to prove what Clearing engineering competence has done, many times over, to meet unusual press demands. No matter how special your problem may be, Clearing engineers have the imagination and the technical knowledge to make your production dreams come true. As you plan tomorrow's operations, it will pay you to consult with Clearing.

SPECIFICATIONS

Capacity: Inner slide, 900 tons
Outer slide, 800 tons
Stroke: Inner slide, 42″
Outer slide, 31″
Strokes per Minute: 5
Bed Area: 106″ x 102″
Die Cushion Equipment: 240 tons

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Industrial News Summary...

- **Scrap Prices Reach Ridiculous Levels**
- **Grades Selling Higher Than New Steel**
- **Steel Price Cut Talks on the Increase**

THE price of iron and steel scrap became so ridiculously high during the past week that some delivered scrap prices in the heavy melting grades were as high as if not higher than the price of new steel ingots delivered to the customer in the same areas. Although the latter product is difficult if not impossible to obtain the paradoxical condition whereby scrap is selling higher than the product in which it is a raw material may be taken as an indication that such an unusual market may not stay long at such record-breaking price levels.

The situation in cast iron scrap this week is even more confusing—some users unable to obtain pig iron are paying prices ranging from $5 to $10 more per ton for cast iron than quoted delivered prices on pig iron. Competitive bidding in the various markets has been largely responsible for this situation and the fact that the steel industry sees ahead of it several months of high output is a sustaining factor in the current high scrap quotations.

Scrap prices advanced this week in major consuming markets, the result of which has moved THE IRON AGE steel scrap composite figure from $31.67 a gross ton to $33.75 a gross ton, an increase of $2.08 a ton. In the Pittsburgh district where less than one-half of required scrap supplies is furnished by the area itself the market is quotable this week at $35 to $36 a gross ton. A large interest there has placed orders at $35 a ton but material continues to move in from the outside at delivered prices ranging from $36 to $39 a ton.

THE present high scrap market at best rests on shaky foundations. Scrap from manufacturing concerns is expanding in volume, a tremendous increase in the number of small peddlers has materialized and the trend of tie-in sales and other new wrinkles in obtaining steel supplies is downward. All of these factors plus the probability that steel supplies will be easier within the next 3 or 4 months are expected to operate in favor of a more normal scrap market.

The immediate outlook for obtaining steel supplies is still gloomy. Some consumers are only now feeling the effects of the coal strike late last year and the failure of shipments to reach some manufacturing plants in the Midwest in sufficient quantities to maintain normal operations has caused some layoffs. Extreme tightness still reigns in the flat-rolled steel category. The unusually high operating rate in the steel industry, however coupled with the elimination of a steel strike threat and the possibility that the coal mines will not be shut down in the near future has caused most steel officials to believe that a more normal distribution of steel products is now definitely in the making.

Steel consumers recently have adopted a far more cautious attitude in their steel purchases and wherever possible have substituted different grades or have made other changes in buying habits in order to escape higher steel prices many of which are involved in extra charges. Even though steel business is definitely on a price-at-time-of-shipment basis, the dissemination of talk concerning possible steel price cuts has caused some large consumers to at least consider the possibility of going a little slower in planning future purchases.

SOME Washington sources and a few steel officials have indicated by their remarks that the steel industry would do well to reduce some of its prices, but such suggestions have been definitely tied-in with the prerequisite that there be no increase in current steel wage rates. To believe that the steel workers' union would accede to a status quo in its wage rates is to be a little bit less than realistic. However since the USWA has at no time mentioned a specific wage demand except by saying that it wanted a "substantial" one, there is no bar to negotiations which could result in a compromise on the wage-price problem.

Despite efforts to treat the steel wage negotiations as an industry problem, the outcome of these meetings is important to and will be felt throughout American industry in general. Whatever wage patterns are set and whatever price policies are adopted will dictate the actions of practically all of the steel industry's customers and it is for this reason alone that the responsibility of steel management and steel labor is now greater than at any other time in peacetime history. Considering this situation and analyzing the current peaceful relationship between the two groups, it would not be too surprising to see a precedent-shattering agreement between the steel corporation and the USWA whereby a moderate wage increase might be granted accompanied by a moderate steel price decrease.

Such a wage increase, however, would probably have to be accompanied by some of the social security benefits for which the union is pushing and a price decrease, if it should come at all, would have to be more than an empty gesture. These are the major points which must be decided in the current steel negotiations after the mutual nightmare of the portal-to-portal suits has been eliminated from the picture.

Steel ingot production this week continues at the highest peacetime level in history and the rate is up one point to 93.5 pct compared to last week's revised rate of 92.5 pct.

• **FULL SPEED AHEAD**—The Washington Steel Corp. is moving fast to get its plant into production by the end of March. The Sendzimir mill, motors, controls, and switchgear have all arrived at the mills, and the mill will probably be turning over late in February or early in March. Commercial production is anticipated late in March. Some motor brakes still have to be delivered, but to get the mill going the company will install some temporary brakes. The company will roll very light gage stainless sheet and foil.

• **CANADIAN NAILS**—Production of wire nails in Canada during November totaled 6002 tons, which is the highest monthly total since last May. Output for October was 3000 tons and for September 1640 tons; however, in the last 2 months nail production was seriously hampered due to shortage of wire rods resulting from the strike at the three big Canadian basic steel mills.

• **ENGLISH BLACKOUT**—Fuel shortage caused by transport breakdown in nationwide snowfalls has blacked out three-fifths of England during five peak hours each day this week. Most important steel producing areas are unaffected but important consuming industries including automobile centers and machine tool factories are shutdown by Government order. Estimates of temporarily unemployed are as high as 5 million. The Government is attempting to rebuild fuel stocks by drastically reducing consumption this week but cuts may be extended for 2 or 3 weeks. British weekly magazines which did not miss an issue during the war are canceled for the next 2 weeks by Government order.

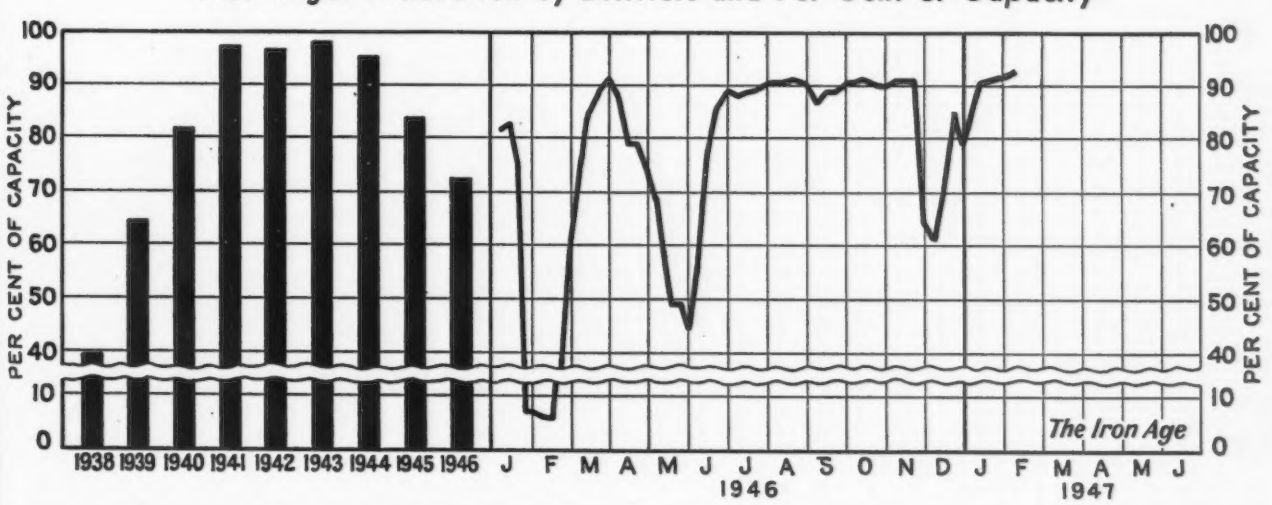
• **TOBACCO-FLUE SHEET STEEL**—Voluntary acceptance by the steel industry of orders for 5000 tons of light gage tobacco-flue sheet steel has been announced by CPA after a meeting with the Sheet & Strip Industry Advisory Committee on Distribution on Feb. 6. Industry representatives stated that the cold-rolled steel used in the manufacture of heating flues for curing tobacco would be delivered in time to be used for this season's crop, CPA said. The 5000-ton figure, set by CPA after consultation with the Dept. of Agriculture, represents a 20 pct reduction in the amount of flue sheet used last year.

• **STEEL CAPACITY DECLINE SMALL**—Total capacity for the production of steel ingots and steel for castings in the United States on Jan. 1, 1947, was 91,241,250 net tons, compared with 91,890,560 a year earlier, according to the American Iron & Steel Institute. The decline was less than 1 pct. Open hearth capacity on Jan. 1, 1947, was lowered to 81,010,990 net tons from 81,236,250 on Jan. 1, 1946, while electric furnace capacity was reduced to 5,076,240 net tons from 5,500,290. Bessemer furnace capacity remained unchanged from the year-earlier total of 5,154,000 net tons. Crucible capacity remained at 20 net tons. Blast furnace capacity was reduced to a total of 65,709,200 net tons of pig iron and ferroalloys as of Jan. 1, 1947, against 67,340,590 net tons on Jan. 1, 1946. The capacity of coke pig iron furnaces was lowered from 66,311,410 tons to 64,674,020 tons, with a small portion of this change reflecting an increase in ferroalloy capacity to 1,002,700 net tons on Jan. 1, 1947, from 996,700 net tons a year earlier. The capacity of charcoal pig iron furnaces was unchanged at 32,480 net tons. Current steelmaking capacity is almost 10,000,000 tons larger than it was before the war, and capacity for pig iron has shown a similar net gain. On Jan. 1, 1940 the industry's capacity for steel ingots and castings totaled 81,619,496 net tons, while capacity for pig iron and ferroalloys amounted to 55,723,640.

• **FOREIGN PIG IRON**—An additional 500 tons of English iron is scheduled to arrive in Boston any day now and 700 tons will load for Boston about Feb. 15. These two lots plus 1000 tons landed there last month are part of 4000 tons bought by the Draper Corp., Hopedale, Mass., at $70 to $75 a ton delivered. The 2000 tons of so-called Polish iron landed in Boston last week went to another Massachusetts textile machinery manufacturer, according to some authorities. Customs House officials will give no details, however.

• **BATTERY MAKERS OPTIMISTIC**—Battery manufacturers who sold $45 million worth of industrial batteries in 1946 expect to sell $55 million volume this year. Manufacturers indicate it will take them 4 years to fill present orders and meet the potential demand for industrial batteries.

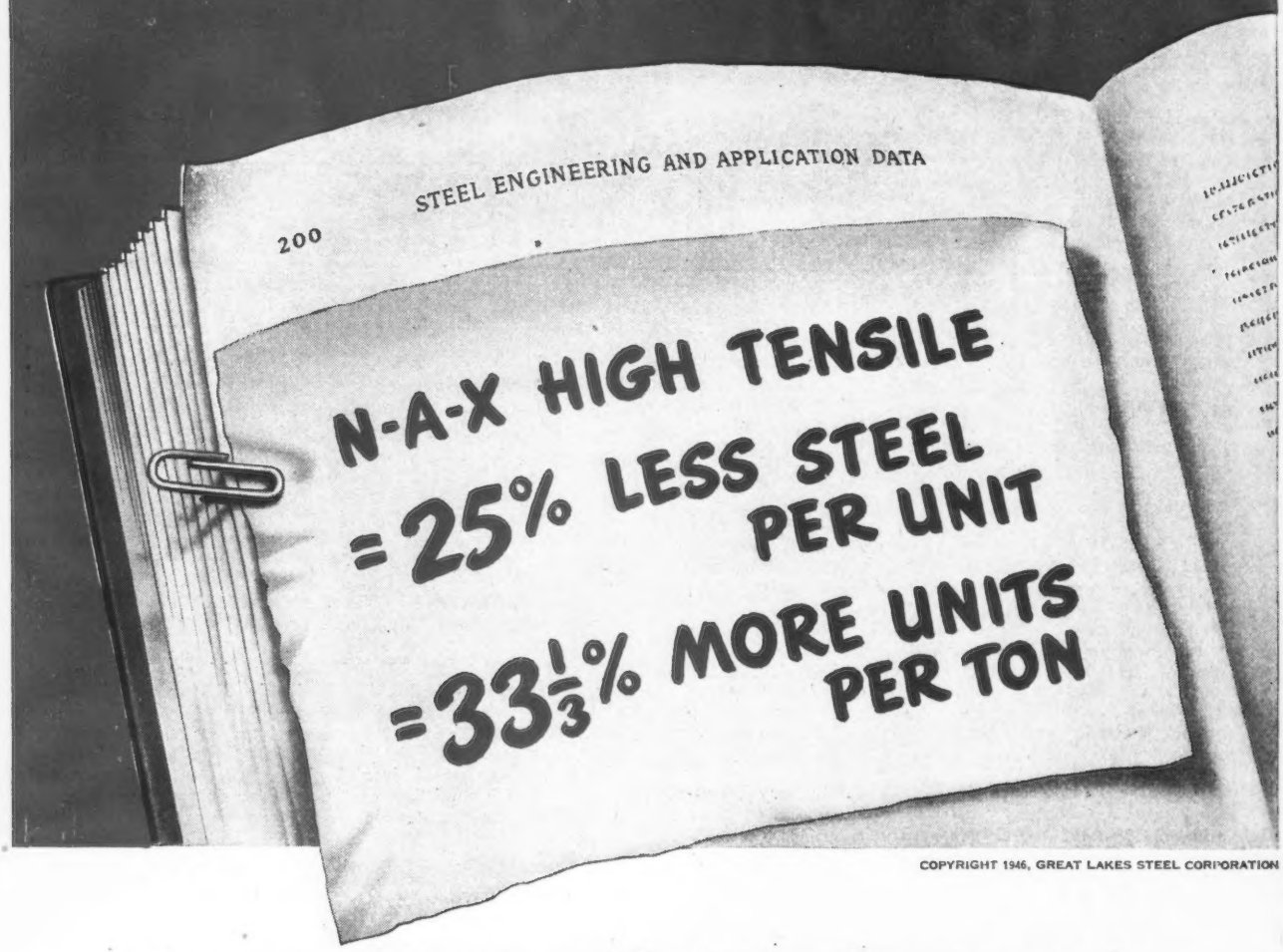
Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
February 4.....	93.0*	91.5	92.0*	93.0	100.5	104.0	100.0	99.0	100.5*	103.0	104.5	76.0	84.0	92.5*
February 11.....	98.0	92.5	92.0	93.0	97.0	104.0	85.0	99.0	102.5	99.0	102.0	76.0	95.0	93.5

* Revised.

THE NEW ARITHMETIC IN STEEL



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Steel Price Cut Talks Held Possible Sales Deterrent

Officials Say No Wage Increase Would Allow Price Decline; Compromise Possible

o o o

By TOM CAMPBELL
News-Markets Editor

o o o

New York

• • • **Talk both in and out of the** steel industry over the feasibility of reducing steel prices has caused some research men to wonder if this development may not cause some large consumers to consider withholding or cutting down steel orders until a definite wage-price policy is negotiated. In the past reports concerning the remote possibility of a price decline have always had repercussions in the steel market. Recent remarks are believed to be no exception to the general rule.

Some Washington sources and at least one steel official have indicated that the industry would do well to reduce its prices—but such action would be predicated on the basis that labor would ask for no wage increase. From a government standpoint it can be seen why a reduction in steel prices no matter how small would be welcome. Certain sources in that quarter are fearful of more than a moderate recession and according to informed sources are of the opinion that if there is a general move for lower industrial prices a recession could be prevented.

From the steel industry standpoint, however, both in public statements and in private, the assumption is that steel prices cannot be reduced unless the steel union foregoes its demand for a substantial wage increase. Nevertheless considering the current peaceful attitude on the part of both labor and management, it would not be too surprising to see a precedent-shattering agreement between U. S. Steel Corp. and the United Steel Workers of America.

There has been no definite indication so far, at least publicly, that the steel industry and the union have decided how far each will go in an attempt to maintain friendly relations and still reach an agreement, the beneficial effect of which would be felt throughout industry generally. The outcome of the steel wage negotiations takes on a national importance and more and more industrialists have come to the conclusion that the action eventually taken by the Steel corp. and the union will determine a wage and price pattern for a great many of the steel industry's customers.

Before Mr. Murray finishes his negotiations with the steel corporation he will be faced with a dilemma, the outcome of which may well determine future labor relationships as well as an economic future for both steel companies and their employees. According to some sources the steel industry is now willing to reduce its prices if wages are not advanced. To expect Mr. Murray, however, to agree to drop his demand for a wage boost is being anything but realistic, according to labor authorities.

On the other hand a study of labor statements on a wage increase in the steel industry fails to disclose any evidence that an unreasonably high wage rate is being sought. The only demand

The Old Swimming Hole

made has been for a "substantial" increase. According to some sources the word "substantial" could be quite flexible when measured against concessions other than actual wage rates.

There are some in both labor and industry who believe there is more than a remote possibility that the steel wage negotiations will end in a compromise of both extreme views. These sources believe that it is entirely possible that a small wage increase plus social benefits could be granted coupled with a moderate decrease in the price of certain steel products. Regardless of whether this comes to pass the talk already generated about the wage price question has become so disseminated that unless the situation becomes clarified within the next month or so it will have a strong effect on fresh steel order volume. This is the opinion of some steel officials who are well versed in the sensitive relationship between steel prices and customer reaction towards possible price reductions.

More important from the national standpoint, say market observers, is the "follow-the-leader" attitude on prices and wages which steel fabricators, processors and manufacturers take on steel industry action concerning wages and prices. While steel negotiations may be out of the spotlight for the time being, the implications of a final agreement are by no means underestimated.

Says Steel Industry Would Be Pleased With 85 Pct Capacity in '47

Chicago

• • • **Edward L. Ryerson,** chairman of the board, Inland Steel Co., in a talk concerning the 1947 market outlet for steel, before the conference on distribution conducted by the Chicago Association of Commerce & Industry, said, "If I were to judge the market outlook for steel by the comments and pleadings of our customers, I would reach but one conclusion—that to satisfy the requirements of these users of steel, the industry would either have to double its capacity at once or advise the trade that their immediate needs might be scheduled for delivery by the end of 1948." The speaker went on to say that never in the history of the industry has anything been equal to the present pressure for advancing delivery schedules and increasing tonnages from every possible user of steel products.

He invited the group to take a look at 1947 wherein the present demand far exceeds the available supply even on a 100 pct operating rate basis. Mr. Ryerson referred to our present total producing capacity of 92 million tons. He said, "That's a lot of steel, the total being about 29 million tons more than was produced in 1929. It might seem fantastic to believe we can cut up and use for civilian needs 29 million tons more steel in 1947 than we used in the boom year of 1929. However, in terms of the outlook for this year, I think most of us would agree that anything approaching an 85 pct of capacity operation would be a satisfactory outlook, and we in the steel industry would settle for such a basis right now. Eighty-five pct operations would mean an output of approximately 78 million tons, or 15 million more than were produced in 1929."

The speaker observed that all industries in 1947 will not have the same requirements as they did in 1929. One typical case cited was the container industry, which used approximately 3 million tons more in 1946 in spite of the fact that many people seem to think glass and paper are taking the place of the tin can.

Mr. Ryerson added, "It is interesting to note that the export tonnage for 1946 was only about 700,000 tons more than 1929. What the immediate future will develop insofar as our exportation of steel products is concerned is very hard to say at the moment, but it should be pointed out that foreign producers have lost about 36 million tons of available capacity since 1939. Based upon any study of all these facts and figures it is easy for one to reach the conclusion that the year 1947 should see a continuation of a strong demand for steel products closely approaching our capacity to produce.

In concluding his address, Mr. Ryerson said, "Therefore, I reach the final conclusion that unless we face a period of strong recession through buyer resistance, the outlook for the steel industry should be one of continued production at near capacity levels, with a profitable return. Of particular interest to our Chicago market for goods, it should be pointed out that the distribution figures for 1946 show that the five states of Wisconsin, Illinois, Indiana, Michigan and Ohio alone consumed, in their manufacturing establishments, 50.5 pct of all the steel produced in the U. S."

UNSOUND PRACTICE: *Mines, it is said, are not normally handled in this fashion. On the other hand, mining of quiet waters in time of peace is considered bad form and an investigative committee is enroute to check the planting of German mines in the Corfu Channel damaging two British destroyers. Here British seamen remove a mine said to be in remarkably good state of preservation.*

Car Registrations Reported

Detroit

• • • **Based on an estimate of 215,000 new cars sold in December, total new car registrations for the year 1946 will be 1,750,000 according to R. L. Polk & Co., Detroit.**

Important Relaxation In Permitted Uses Of Tin Announced by CPA

Washington

• • • **Elimination of all quota** restrictions in the tin conservation order, M-43, and some relaxation in the permitted uses of tin became effective on Feb. 6. CPA said, however, that the relaxations do not approach in extent the recommendations of industry because the present tin supply does not justify any appreciable increase in its use.

Important relaxations in the amendments are: (1) Permission to use tinplate of specified weights for domestic kitchen equipment (formerly not permitted) and also permission to use 0.25 lb tinplate for the types of crowns and closures which were formerly restricted to blackplate; (2) pure tin pipe is now regarded as pig tin and may be used in the manufacture of food and beverage dispensing units, including soda fountains; (3) tin oxide may now be used in the production of earthenware plumbing fixtures; (4) tin may now be used to plate snap fasteners, hooks and eyes; and (5) the percentage of tin permitted for use in solder has been increased.

Other changes on tin restrictions include: (1) The 6000 lb small-order exemption from the CPA tin allocation program has been reduced to 4000 lb to give CPA a better distribution control; and (2) the 30-day inventory restrictions on solder, babbitt and other alloys containing tin, formerly in Dir. 2 of M-43, have now been incorporated in the order itself and the direction has been revoked. Amendment 1, applying to babbitt has also been included in the order.

Under the former quota system, each user was restricted to a percentage of the tin which he had legally used during a base period. Elimination of the quota plan will relieve industry of much bookkeeping and the necessity for filing appeals when quotas have been consumed. It will also considerably reduce CPA's paper work. However, CPA will continue to allocate pig tin during the first quarter. Allocations have been set at 18,500 tons, representing only a slight increase over allocations in the fourth quarter of 1946. Continuation of controls on tin beyond the first quarter is dependent on Congressional enactment of President Truman's request for a 12-month extension of some of the war powers.

Other significant changes in Order M-43 as embodied in Schedules I through IV are as follows:

Schedule I: The permitted tin content for electrotypers' foil has been increased from 16 to 30 per cent. Tin content for dental foil is now unlimited as compared with a former 30 per cent restriction. Tin or tin chemicals may be used as laboratory reagents, for medicinal purposes and for plating processes where such plating is permitted by the order. Tin oxide may be used for the production of chrome green, pink, yellow and red colors. (Tin is not needed for the production of other colors.)

Schedule II: The permitted tin content on soldering end seams on all solder-seamed cans has been raised from 26 to 30 per cent. For soldering electrical equipment and other specified use, the permitted tin content in solder has been raised to 50 per cent from 40 per cent; for other **hand soldering operations** to 40 per cent from 35 per cent and for any other soldering operations to 35 per cent from 30 per cent.

Schedule IV: Now permits the use of 3½ per cent tin in ingot bronze for production of plaques, markers and monumental castings. Tin is now permitted to be used without restriction in the production of wrought copper base alloys.

Portal Problem Pushed

Washington

• • • **Congressional leaders** have placed legislation on portal pay at the top of their labor calendar, with the dismissal of damage claims in the Mt. Clemens case and the accompanying 7500-word decision serving as their first legal hint as to a definite approach to the problem.

Although this latest court decision is regarded in many quarters as automatically ruling out a portion of the pending $5 billion worth of suit against the steel and other industries, it is likewise admitted that the factors governing the decision in the Mt. Clemens case are not readily comparable to those affecting steel, automotive and other industries. Nor is there any indication that labor intends a let-up in prosecution of such suits.

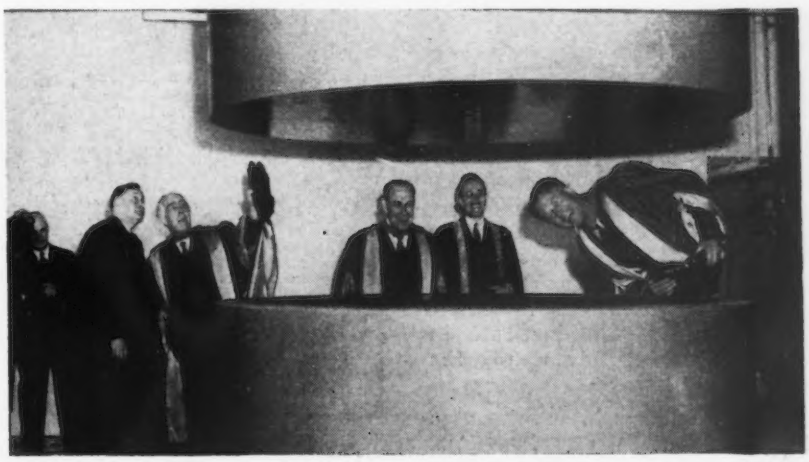
In the closely reasoned opinion, two major points were seen as clues to possible legislation. One was that time spent for the benefit and convenience of the worker himself should not be considered as part of the work-day or week. The other, important in its implication, was that in no event should back pay awards under such suits extend back past last June, at which time the Supreme Court handed down its decision.

Offers Counter-Proposal

Washington

• • • **WAA has authorized** a counter-proposal to the Lone Star Steel Co. for the purchase of a blast furnace and iron ore mines at Daingerfield, Tex., and three coking coal mines near McAlester, Okla. The company was given 15 days in which to accept or reject the proposal which calls for purchase of the property as a whole. The furnace, a wartime project, was never fully completed or in operation.

ATOM PROBER: *With no attempt to stand on their dignity, scientists at McGill University examine the university's partly completed* 100 *million volt cyclotron. Believed to be among the largest in the world, the atomic investigator was built at the Lachine, Que. shops of Dominion Bridge Co. and contains* 300 *tons of steel. Left to right, Professors Foster and Bohr, Sir John Anderson, Principal James and Prof. E. O. Lawrence.*



Steel Industry Voluntarily Agrees to Aid Freight Car Program

But Major Worry is Whether Increased Steel Supplies Will Meet ODT Setup

o o o

By GENE HARDY
Washington Bureau

o o o

Washington

• • • **Regardless of the controversy** that still rages over the freight car shortage it is clearly evident that the steel industry has voluntarily agreed to supply enough rolled steel to substantially increase current car output. Whether the voluntary program will succeed in raising output to 7000 cars a month, as planned by CPA, or 10,000 a month as consistently demanded by ODT, is open to question.

Several facts, however, are selfevident. Most important is that after a year of squabbling among CPA, OPA, OES, ODT, OWMR, and OTC the government has finally worked out a program which should ease the freight car shortage—now troubling most of the nation's industries.

On the one hand, CPA, taking as its cue a White House directive of last fall calling for freight car output of 7000 cars a month, has worked out a program on this basis. The agency has met with the steel industry and its industry advisory committees many times within recent weeks and on Feb. 5 announced that the various steel mills had agreed to schedule the tonnage needed for building this number of cars in addition to the tonnage necessary to repair cars now laid up. As much of this steel as possible will be scheduled during March. The full program is expected to be in effect in April and continue for an indefinite period.

On the other hand, Col. J. Monroe Johnson, ODT director, told a Senate Interstate and Foreign Commerce Subcommittee on Feb. 5 that after consultation with the American Iron & Steel Institute he had been assured by institute officials that the industry would "immediately supply enough steel for car repairs and the building of 10,000 new cars monthly." He pointed out that he was almost convinced that this would be done and that there was no hesitancy on the part of the institute in committing themselves to the 7000-car program.

Colonel Johnson later reiterated this statement to THE IRON AGE and also stated that, of course, he would be happy if "enough steel could be immediately provided to raise car output to 5000 monthly." Recent domestic freight car production has been averaging around 3500 monthly. However, retirement of cars for repairs or obsolescence has been averaging over 4500 monthly, resulting in a net monthly loss to the railroads of more than 1000 cars.

While on the surface there appears to be a direct conflict between the two programs, this is not the case. The 7000 figure has been worked out by CPA and the steel industry as the maximum that can be obtained in the immediate future. CPA officials told THE IRON AGE that the 10,000 figure is considered as a goal which may be reached later in the year.

This point was substantiated by OMWR Commissioner Harold Stein, who has been handling the White House end of the program, when he said that under the 7000 car plan "it is possible that car production may increase to about 8800 in May and more than 9000 in June—of course depending on the ability of the car builders to procure component parts." Mr. Stein added that cars now on order will maintain production until mid-1948.

CPA's firm program will require the largest steel producers to assume the greater portion of the tonnage required, although it is expected that all steel companies making the products required will contribute in proportion to their abilities.

The monthly steel requirements for the production of 7000 cars, which CPA says the mills have agreed to schedule, are as follows:

Rolled Steel:	
Bars	7,000 tons
Billets	2,800 tons
Plates	35,000 tons
Shapes	30,000 tons
Sheet and strip	15,400 tons
Other Steel:	
Pipe	800 tons
Axles	12,000 tons
Total	103,000 tons

In addition, approximately 65,000 tons will be provided monthly for freight car repairs. It is estimated that cars now laid up for repairs total more than 67,000.

Requirements for wheels are not included, since both CPA and ODT agree that production of steel wheels is at capacity levels, and additional wheels will have to be made of cast iron. Actually, wheels are expected to be the big bottleneck in the program, and car builders may find themselves with completed cars except for the all-important wheels.

ODT claims the following amounts of rolled steel will be needed to turn out 10,000 cars a month:

Bars	15,560
Billets	2,230
Plates	60,130
Shapes	60,330
Sheet and strip	30,830
Total	169,080

ODT estimates monthly repair requirements for rolled steel at approximately 107,600 tons. Officials of ODT say that in their talks with the American Iron & Steel Institute they were assured that this amount of steel would be provided if the car builders can get the other necessary compo-

Domestic Freight Cars On Order Jan. 15, 1947

Type	
Auto box	4,600
Plain box	26,262
Covered hopper	2,078
Flat cars	921
Gondola	4,618
Hopper	11,445
Phosphate	200
Pulpwood	300
Refrigerator	9,705
Tank	4,660
Twin hopper	1,250
Stock	200
Miscellaneous	9,122
Total	75,361

nents, but that steel will not be shipped if it cannot be used immediately for car production. ODT also says that they were informed that the only tough procurement problem would probably be in plates.

The freight car shortage has been the subject of prolonged hearings before the Senate Subcommittee and many of the recent developments can be traced to information developed for the committee.

At these hearings, Colonel Johnson said the shortage was due to lack of steel and other materials; hesitancy on the part of the railroads to order cars; foreign orders; WPB's failure to heed ODT recommendations during the war; and general indifference on the part of all concerned.

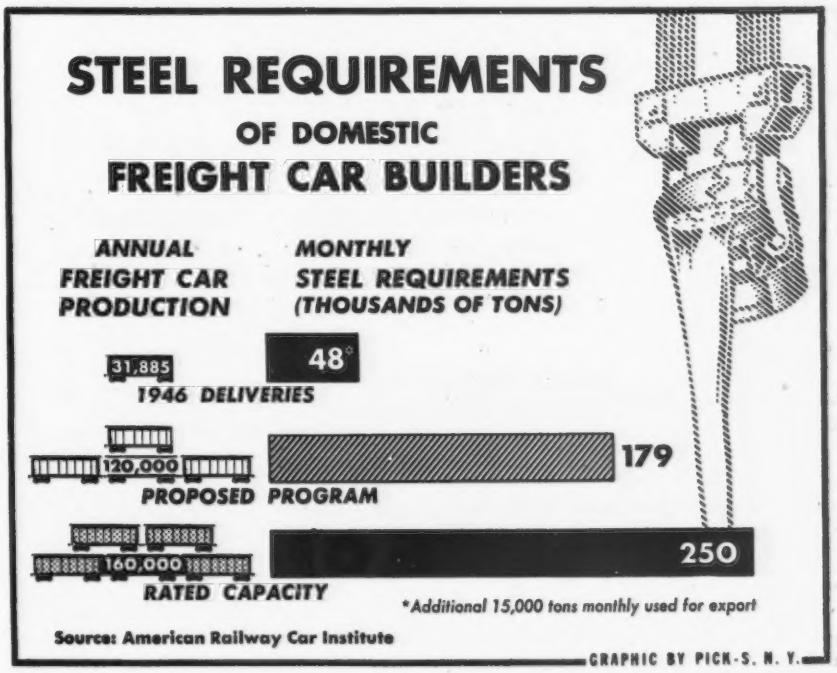
S. M. Felton, president, American Railway Car Institute, agreed, in general, with Colonel Johnson's views on the reasons for the shortage, but added some of his own and disagreed with the ODT director on the part export orders played in contributing to the shortage.

In regard to export orders, Mr. Felton said: "I can assure you that they have been an impetus rather than a retarding factor to domestic production by permitting our car building companies to begin their reconversion processes before orders in bulk began to come from the American railroads. These orders permitted the car builders to begin opening idle plants, rehiring employees, and in general get back into peacetime business."

The largest export order received during 1946 was for the rehabilitation of France and amounted to 36,750 freight cars. These cars are only about half the size of domestic cars and require, therefore, just about half as much materials.

Mr. Felton also pointed out that while the railroads continued to lose money during 1946 the ICC dillied and dallied with a rate increase, and as a consequence they were reluctant to spend large sums on new equipment. Since the rate increase was announced orders have climbed, with 32,800 cars ordered during the last 6 months of 1946, and 8300 ordered in January.

In the opinion of the Railway Car Institute what is needed is a program calling for full utilization of the industry's capacity—14,000 cars a month.



Concluding, Mr. Felton stated that "the hard facts are that the present shortage in freight cars is the product of 10 years of depression, followed by 5 years of war. There is no shortcut that we know of for ending it—even with the utmost of cooperation between the government, the industries involved in production, and the railroads."

When it is realized that there is, even in normal times, a lag of about 5 months between orders and delivery the full import of Mr. Felton's statement becomes clear. While the shortage has been building up over several years, it reached its peak during 1946—when production showed an almost consistent decline which has continued into the current year.

During 1946 the car builders were able to deliver to American railroads 31,885 freight cars, an average of just over 2500 a month, and the railroads themselves built 10,070. Production during 1946 was almost exactly equal to the backlog of 32,000 cars which existed on Jan. 1, 1946. However, this production would have kept the industry going only about three months, and, consequently, the export orders kept the lines open.

Also during 1946, 18,020 cars were delivered for export, 10,000 of these going to France.

However, production dropped sharply in the last half of 1946. In June, 3456 new cars were delivered; in July, 3423; 5141 in August; 4016 in September; 3828 in October; 3246 in November; 3135 in December; and in January, 1947, 2408.

Sees Completion Of One Million Housing Units During 1947

Washington

• • • **Completion of 1 million** housing units and the starting of a similar number is anticipated for 1947, according to Frank R. Creedon, Housing Expediter under the emergency housing program.

The chief cause for this optimistic outlook, is not only the loosening up of building materials but also the removal of the $10,000 price ceiling and the lifting of other restrictions which virtually confined housing construction either to veterans or for veteran-occupancy.

This change of policy, Mr. Creedon explained, is expected to increase materially the number of persons who can and will build new homes this year; each new home, regardless of price, results in a vacancy for someone.

Army-Navy Munitions Board Seeks Industrial Cooperation

Will Form Advisory Groups To Help Services Plan For War Mobilization

o o o

By KARL RANNELLS
Washington Bureau

o o o

Washington

• • • **Steps are to be taken** in the immediate future to set up industrial advisory committees which will assist the Army-Navy Munitions Board in formulating a program for rapid mobilization of industrial facilities and natural resources in the event of future emergencies.

Richard R. Deupree, Board chairman, told THE IRON AGE that invitations will soon be issued to a selected list of industrial leaders and technologists, asking them to serve as members of these advisory groups. The first committees to be formed will be assigned to the Materials Division where their work will be concerned chiefly with the stockpiling program.

While the initial letters of invitation are ready to be mailed out, Mr. Deupree explained, due to the varied nature of the materials which must be studied and the number of items concerned, it may take some time to complete the committee rosters and to organize the groups for work, perhaps as much as 6 months.

As the program progresses, the Board will expand its plans and activities in this direction so as to provide for the formation of additional advisory groups to assist in mapping other phases of industrial mobilization planning.

Under the recently completed plans for the cooperation of industry, now announced officially for the first time, at least a score of advisory committees will be formed during the initial stages of the program. Probably all of them will be assigned to the Materials and Products Division.

In addition to an iron and steel products advisory committee, there will be similar groups for most of the following fields or industries:

Copper and copper base alloys, aluminum and magnesium, nonferrous metals, ferrous and nonferrous additive alloys, nonmetallic minerals, fuels, chemicals and drugs (already functioning), rubber, fibers, forest products, textiles, foods, leathers, and oils, fats and waxes.

While some of the foregoing materials are not included on the Board's A ("must") list of stockpiling, it will be the job of the various advisory groups to help formulate a workable program for conservation as well as procurement, ready to be put into effect immediately upon declaration of a state of emergency.

On the other hand, committees assigned to problems related to the Materials Division will study the situation and advise the Board as to what degree a strategic item, such as tin or lead, is critical, in what amounts it should be stockpiled, its availability and best resources, and on all problems of acquisition, processing and maintenance.

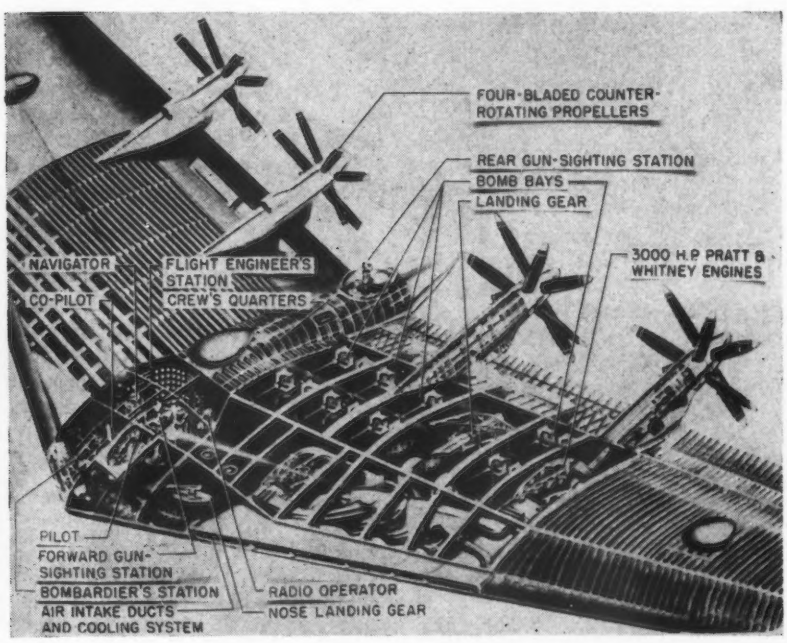
These committees will be primarily concerned with the raw materials and processed items up to the end product stage. For instance, in the case of iron and steel the committees will be composed of representatives from not only the iron ore mining industry but also of those connected with the forging, casting and other primary processing businesses.

When the iron or steel reaches the cast, forged or other rough-finished stage, it then becomes a problem for the Products Division and its advisory committees. It will be their task to plan for the supply and use of the end products or their component parts.

The various committees are to be carefully selected so as to represent all businesses, at all levels —for both large and small industries, from producers of basic materials to manufacturers of the finished product. Regional or geographical representation is also assured, Board officials declared.

"An absolute representation of the nation's industry—the strongest element of our national defense—is mandatory," Mr. Deu-

INSIDE JOB: *Artist's drawing shows general details of the interior arrangement of the Army's B-35, Northrop "Flying Wing." The 15-man crew is housed in a pressurized section of the craft which is unique in that most of the wing-fuselage provides "lift." The AAF has 15 B-35's on order, two of which will each be powered by eight GE jet engines.*



pree said. "Without the benefit of industry's knowledge and advice, we can never be assured of preparedness for emergencies."

While the committees will be composed of leaders in the various industrial and business fields, their membership is not to be chosen arbitrarily by the Board. Nor is it a pull-a-name-from-a-hat process.

Every effort will be made to have the membership on each committee truly representative of a particular industry. Large, medium and small industries will be represented and in those cases where an industry is distributed geographically about the United States, the Board will endeavor to select the membership of the committee so as to obtain the best advice available from all sections of the country.

Similar advisory committees will be formed later to assist in planning for marshalling and converting, if ever necessary, the nation's industrial facilities to the production of ordnance items, aircraft, ships, transportation and industrial equipment, and the other major lines essential for defense.

Preparation of such plans, it is pointed out, is only a part of the program. With the help of the advisory committees, the Board must constantly keep all phases of the plan under revision in the light of new developments and constantly revise it to keep pace with scientific and industrial changes.

Other work will involve studies of industry in order to figure out probable bottlenecks which would impede emergency production and then to devise plans by which they may be avoided. This latter will include determination of the availability and quantities of tools and machinery as well as of raw materials. Conceivably, some equipment may have to be built, procured and placed in standby condition, ready for use if need arises.

Also, new developments may require that the program include keeping in production at all times small quantities of the newest weapons, equipment, and so on. New items thus produced may be tested and blueprints and models can be furnished to manufacturers as soon as mobilization becomes a necessity.

This involves planning for production pilot lines in some privately owned plants. Some of the former war plants will be retained by the government and maintained in a standby condition; some have already been sold with recapture clauses in the contract and others are offered for sale with the same proviso. Plants sold or leased on these conditions are generally those which can be converted to war production in from 60 to 100 days.

Revision of R9-28 To Be Promulgated Mar. 1

Washington

• • • **A revision of** Simplified Practice Recommendation R9-28, woven wire fencing, has received adequate support from producers, distributors and users, and will be promulgated as of Mar. 1, according to an announcement by the Division of Simplified Practice, National Bureau of Standards.

The revision was proposed by a sub-committee of the technical committee on wire rods and wire, of the American Iron & Steel Institute. It presents a simplified list of various designs of the following types: Farm fence, close-mesh fence, wolf proof fence, poultry and garden fence, chick fence, galvanized barbed wire and galvanized two-ply barbless wire.

The new issue will be identified as R9-47, Galvanized Woven-Wire Fencing and Barbed Wire. Printed copies will be available on or about Feb. 24, for 10¢ each, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. A discount of 25 pct will be allowed on orders for 100 or more copies.

Recommendation on Wire Nails, Staples Due Mar. 1

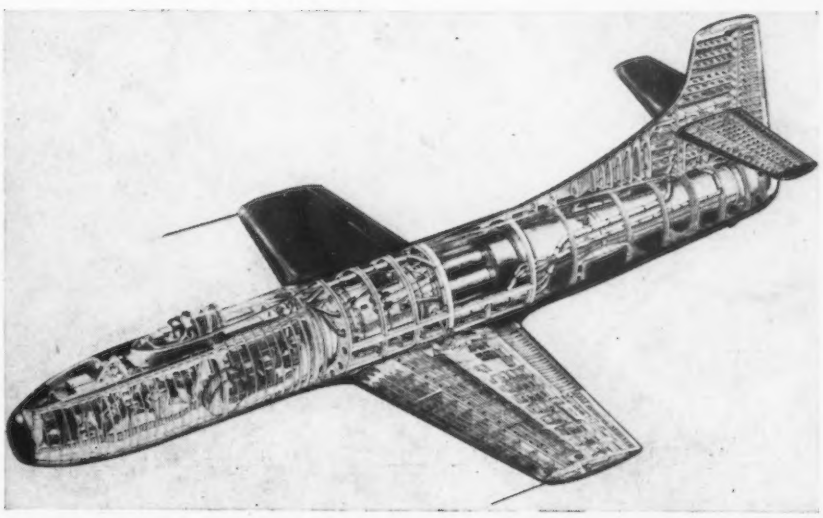
Washington

• • • **The Division** of Simplified Practice, National Bureau of Standards, has announced that a voluntary Simplified Practice Recommendation for wire nails and staples has been approved for promulgation.

The recommendation had its beginning in a proposal of the American Iron & Steel Institute's subcommittee on simplification of standards of nails and staples, barbed wire and woven wire fencing. It comprises 29 tables covering the sizes of fence-staples, poultry-netting staples and the kind and sizes of wire nails commonly used by the various building trades and box manufacturers. Each kind of nail and staple is illustrated to help in identifying it and for visual comparison between the different kinds.

The recommendation will be identified as R223-47, wire nails and staples, and will be effective from Mar. 1. Printed copies will be available on or about Feb. 24. They may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., for 10¢ each. A discount of 25 pct will be granted on orders of 100 or more copies.

RESEARCH REVEALED: *Cutaway view of the Navy's D-558 "Skystreak" built by Douglas and unveiled recently. Like the Army's Bell supersonic ship, the 35-ft long craft is a research craft only. Unlike the rocket powered Army ship, the Navy sound racer is jet powered.*



Develop New Approach to Wage-Profit-Price Relationship

Analysis Shows Effect of Wage Rise on Direct Costs Of Manufacturing

o o o

By GEORGE H. BLACKETT and HENRY B. DALBY
Economic & Financial Consultants, New York

o o o

• • • **On behalf of** a great American labor group a Washington economist has recently published a report recommending an increase in the hourly earnings of wage earners to promote the national welfare. He states that at 1946 levels of production, a 21 pct rise in hourly earnings could and should be granted to labor employed by manufacturing corporations. He says that no increase in prices should occur in conjunction with such a wage rise and that the net income of corporations under these conditions would still equal the "reasonable" profits of 1936-1939. He claims that the resultant gains in the mass purchasing power of wage earners would assure a prolonged level of high production.

Although he makes additional and broader statements, we shall examine these only, as they constitute the heart of the report.

Without taking issue as to whether the net income from manufacturing in 1936-1939 was "reasonable," our analysis has been solely for the purpose of determining the facts; first, the actual results achieved by manufacturing corporations at the 1946 level of production, and second, what that result would have been had the Washington economist's raise been in effect.

First established were the three things necessary to determine net profits before taxes:

(1) The total cost of goods sold—(those direct operating costs of which total payrolls and material costs are major constituents).

(2) Total overhead charges—(all other deductions from total receipts allowed manufacturing corporations in computing their taxable net income).

(3) Total receipts — (total sales, plus investment income, for all manufacturing corporations).

The sum of 1 and 2 equals the total cost to manufacturers of the goods they sold in any year. This sum subtracted from total receipts is net income before taxes.

This article includes a description of the method by which these figures were established and charts giving visual comparisons of the data used. The 1946 figures established are:

(1) Cost of goods sold...	$ 89,000,000,000
(2) Total overhead charge	22,400,000,000
(3) Total receipts	122,500,000,000

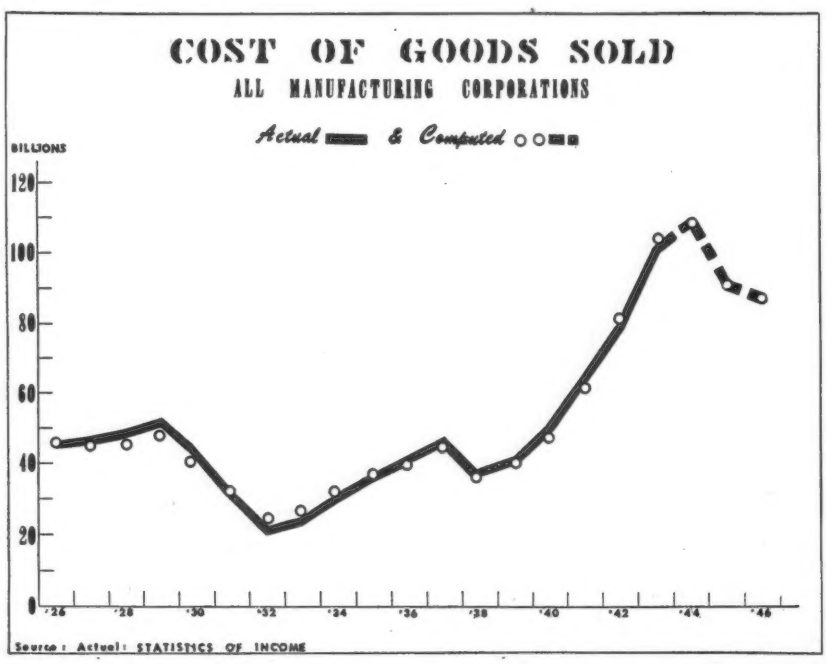
giving net profits before taxes of $11.1 billion.

By the Washington economist's plan prices are to remain unchanged. Therefore, the total costs of manufacturing corporations would change only by the *amount arising from* the wage increase. At the 1946 production level a 21 pct increase in hourly earnings would have raised No. 1, the cost of goods sold, from $89 billion to $102.1 billion. With No. 2, total overhead charges, remaining fixed,* the sum of No. 1 and No. 2 would increase to $124.5 billion. The net result to manufacturing corporations would have been a loss before taxes of $2 billion or a sum equal to 15 pct of the in-

**Note: In actual practice there might be some reduction in selling and administrative expenses but a decrease of a magnitude to offset any substantial share of the increase in cost of goods sold could be accomplished only under depression conditions.*

This study was not prepared specifically as a reply to the so-called Nathan Report. On the contrary, it represents several months of research by the authors, who developed it as a new approach to the wage-price relationship problem. However, for purposes of comparison with a known plan, it is contrasted here with the first Nathan Report which held feasible a 21-pct wage increase without price rises in manufacturing industries.—Ed.

Chart 1



crease in the cost of goods sold and more than twice the losses of the depression year 1932.

No consideration has been given to changes in inventory values resulting from accumulation of unsold goods at higher costs. Loss of income to the government due to the lack of income tax liability on the part of manufacturing concerns has been disregarded, as has the partially offsetting higher income tax liability of the industry's workers.

In order for total receipts of manufacturing to be increased sufficiently to offset a rise of $13.1 billion in costs, without an increase in prices, it would be necessary for production to rise 19 pct above the 1946 level. This means manufacturing output exceeded only in the years 1943 and 1944 when war production was at its peak. It is not practical to expect the increase in the money income of wage earners to result in a gain in demand which would absorb such an expansion of output, because the increase would be realized at the expense of a decrease in the buying ability of all other population groups as well as the manufacturing corporations and their stockholders.

Through the medium of higher prices total receipts could be raised to offset a $13.1 billion advance in costs. An advance of 19 pct in the average wholesale price of manufactured goods, at the 1946 level of production, would approximately counteract a 21 pct rise in average hourly earnings of manufacturing workers. This 19 pct allows for no shrinkage in the market because of higher prices. As a practical matter the price advance would need to be greater to allow for this factor. The "real" wages of the manufacturing wage earner would not improve and the purchasing power of all other groups in the population would diminish.

Whether proposed wage increases would further the national welfare is a question each individual may best answer for himself by taking a look at the record.

It is necessary to provide a quantitative measure of the consequences of changes in wages and prices in terms of business activity, corporation earning power and employment. This involves the establishment of a chain of relationships whereby the effects of a shift in wages, in business activity, in prices (both finished goods and raw material prices) can be segregated. The solution may be found in a correlation process which is neither very difficult nor very complicated. In this article the correlation method is applied to the composite figures of all manufacturing corporations as a means of establishing dollar figures representing essential facts showing present conditions of the manufacturing industry.

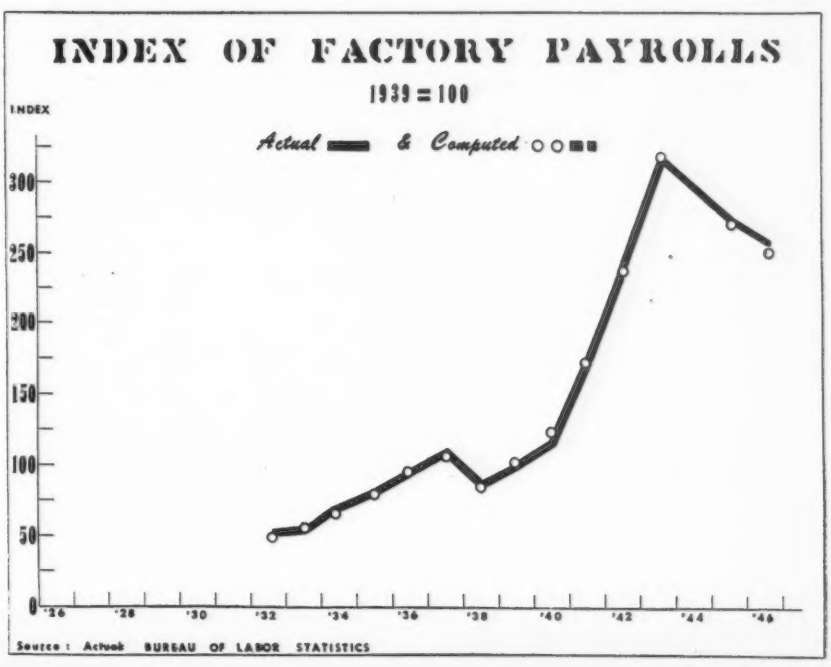
Authentic figures on the earning power of manufacturing corporations are summarized in the reports of the Dept. of Internal Revenue. Unfortunately the most recent publication covers the year 1943. However, this article demonstrates that it is possible to compute total receipts, the principal cost factors and net profit for all manufacturing corporations from 1923 through 1946 by using official statistical series measuring average hourly earnings of production workers, the relative changes in payrolls, the volume of manufacturing production and prices of finished goods and of initial materials purchased by corporations. Since the computed figures conform closely to the official records for 21 years, the figures computed for 1944, 1945 and 1946 can be accepted as factual plus or minus 4 pct.

The computed figures are derived from the official statistical series of the Bureau of Labor Statistics, the Dept. of Commerce and the Federal Reserve Board which are kept up to date. Manufacturing total receipts, costs and profits have been computed over the 26-year period ending 1946, and are compared to actual figures of Dept. of Internal Revenue through 1943. The method of computation permits tracing the consequences of a change in wages, or in business volume or in prices upon the costs and profits of manufacturing.

Manufacturing costs are considered as falling into two general classifications, those which fluctuate directly with the volume of business and those which are relatively fixed and respond slowly to changes in business volume. Because of the difference in the characteristics of these two types of costs it is necessary to compute separately the "cost of goods sold," made up principally of direct costs for labor and materials, and "other deductions" in which are grouped selling and administrative expenses, rent and interest payments, depreciation and depletion and other deductions allowed a corporation in computing its taxable net income.

The term "total receipts" is self-

Chart 2



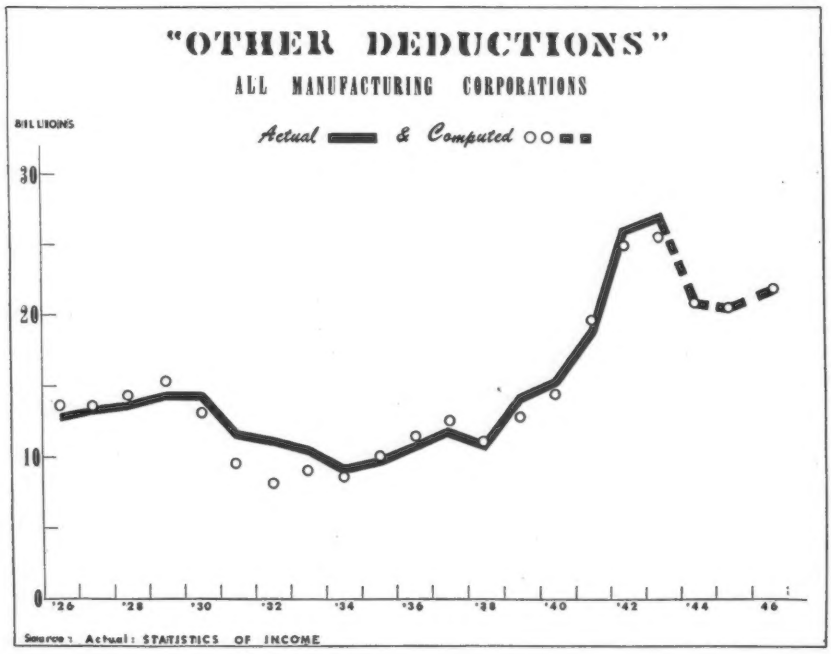


Chart 3

explanatory. It refers to the amount received by all manufacturing corporations from the sale of goods, plus income from investments. In other words, total receipts mean the gross amount taken in by all incorporated manufacturers.

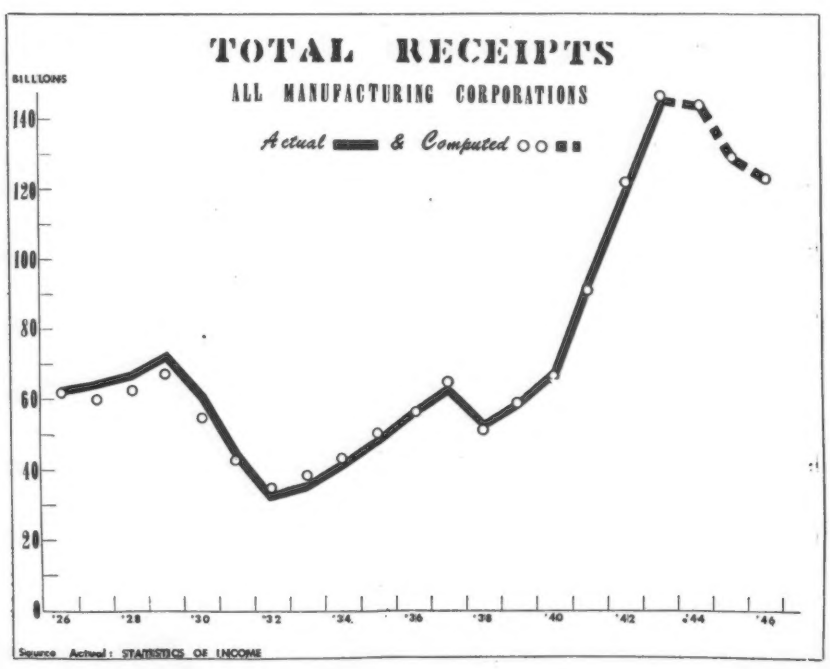
The subtraction of the "cost of goods sold" and "other deductions" from total receipts gives the net income before federal taxes of all manufacturing corporations. It is necessary then to deduct federal taxes to determine the amount left for dividends and other corporate purposes.

The "cost of goods sold" for all manufacturing corporations was computed by an equation derived from correlating the official figures for cost of goods sold with the average annual index of payrolls for production workers and an index representative of initial material prices. The correlation covers the period from 1923 to 1943 when both types of data are available. The solid line in chart 1 represents Internal Revenue figures for cost of goods sold, the dots are computed figures based on the two indices. The computed amounts may be considered as accurate for the years 1944, 1945 and 1946 to the same degree as in the 21 years from 1923 to 1943 inclusive, or within 4 pct of the actual.

Some explanation should be given of this index of initial material prices. Inquiries made in 1929 and 1935 in connection with the collection of census data reveal that 9.9 pct of all manufacturing products reached the finished state within a single manufacturing process; the other 90.1 pct of manufactures went through two or more processes with an initial raw material consumption of 33.3 pct.

About 56.8 pct of the materials used were already semimanufactured. The initial materials used by manufacturers are thus a composite of 43.2 pct raw materials and 56.8 pct semimanufactured goods. The index of initial material prices was constructed by combining in the proportion of 43.2 pct and 56.8 pct the Bureau of Labor Statistics indices of raw material prices and semifinished goods prices.

Chart 4



When labor seeks higher wages it generally expresses its desires in terms of the rate of pay per hour. The Nathan Report makes use of a slightly different measure in most of its discussion, i.e., the average hourly earnings of production workers. Mr. Nathan points out "changes in straight time hourly earnings do not measure changes in labor costs." This is true. The cost to the employer corporation of an advance in the average hourly earnings of its production workers is measured in the rise induced in the production payroll.

The level of factory payrolls is determined by three things: The hourly earnings; the number employed and the hours worked. Because the number employed and the hours worked in turn determine the volume of output it is

possible to compute changes in factory payrolls by using changes in manufacturing output and in average hourly earnings.

This is done by correlating the product of average hourly earnings and the production index with the index of payrolls. As is apparent from chart 2 the index of factory payrolls can be computed quite accurately if one knows the level of production and of average hourly earnings. It is possible, therefore, to tell what the level of factory payrolls will be at any given level of production when average hourly earnings are known.

In the correlation for computing the factory payrolls index an adjustment has been made in average hourly earnings to allow for an annual increase of 2.76 pct in the productivity of labor.

Because of their rigidity, indirect costs, here grouped as "other deductions," absorb an increasing percentage of the operating profit of corporations during periods of business decline and a decreasing proportion during periods of business expansion. The change in relationship has followed a very consistent pattern for many years.

The first step in establishing an equation for "other deductions" was to subtract "cost of goods sold" from "total receipts." The remainder closely approximates operating profit for all manufacturing corporations. This operating profit figure for each year from 1923 through 1943 was then divided by the corresponding figure for "other deductions" as shown in the Internal Revenue summary. Resultant ratios were correlated with the annual average Federal Reserve Board index of manufacturing production.

The equation of relationship made it possible to determine what ratio of operating profit to "other deductions" could normally be expected for any level of the production index. By applying this ratio to operating profit the dollar amount of "other deductions" could be obtained. The actual and computed figures are compared in chart 3.

Total receipts are made up almost entirely from the sale of goods. The dollar amount of sales is obviously dependent upon the volume sold and the price received.

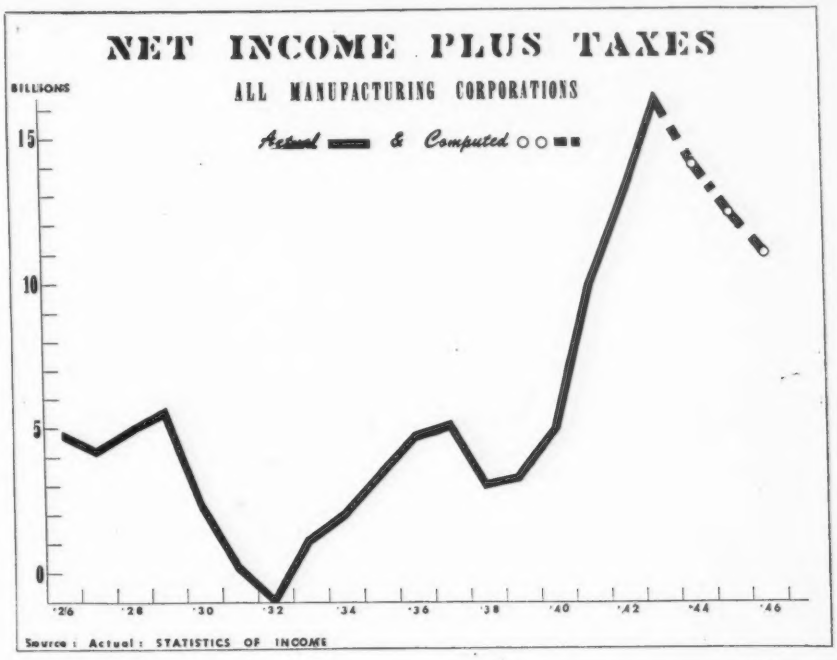


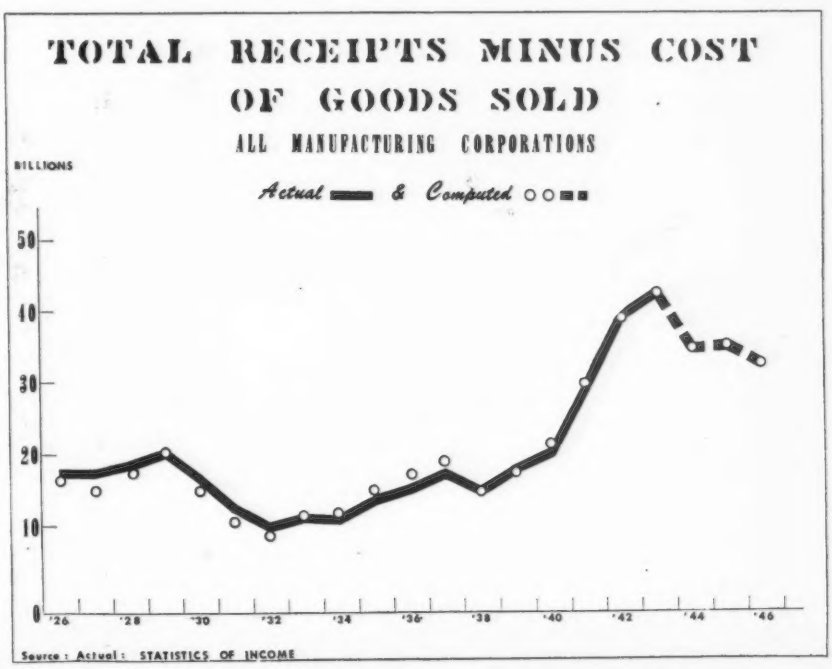
Chart 5

Both volume and price vary widely between years of prosperity and years of depression and in their broad swings are not subject to control by business management.

Total receipts have been established with the results shown in chart 4 by correlating the annual average of the Federal Reserve Board Index of Manufacturing Production multiplied by the annual average of the Bureau of Labor Statistics Index of Manufactured Goods Prices with the total receipts figures published by the Dept. of Internal Revenue in "Statistics of Income" for the years 1923 through 1943. The equation of relationship was determined by the usual least squares method.

The solid line on the chart represents the actual figures, and dots

Chart 6



are the result of computation based on the multiplication of these two index numbers. The projection for 1944, 1945 and 1946 beyond the official record is based on the estimating equation. It is reasonable to believe it is accurate within a limit of about 5 pct.

Chart 5 gives the official record for net incomes before taxes of all manufacturing corporations from 1923 to 1943 together with the computed result from 1944 to 1946. These are derived from the computations of total receipts, cost of goods sold and other deductions described above. It should be noted that the method permitted no adjustment for renegotiation of war contracts and therefore overstates 1944 and 1945 as a result. However, it is apparent that 1946 estimates confirm the Nathan conclusion as to the dollar amount of manufacturing earning power before taxes.

This method of analyzing economic facts and measures has established a series of relationships through which the effects of a wage rise, or a price rise or an increase in production can be traced.

A blanket increase of 21 pct in the average hourly earnings of production workers, at the present level of production and present prices of initial materials, would result in the addition of about $13.1 billion to the aggregate cost of goods sold for all manufacturing corporations.

If manufacturing corporations do not increase prices or expand the volume of their output, an advance of $13.1 billion in the cost of goods sold would come directly out of gross income and would convert combined net profits to a loss of $2 billion before taxes.

It is apparent that the Nathan report has underestimated the effects upon manufacturing profits of a rise in the average hourly earnings of production workers.

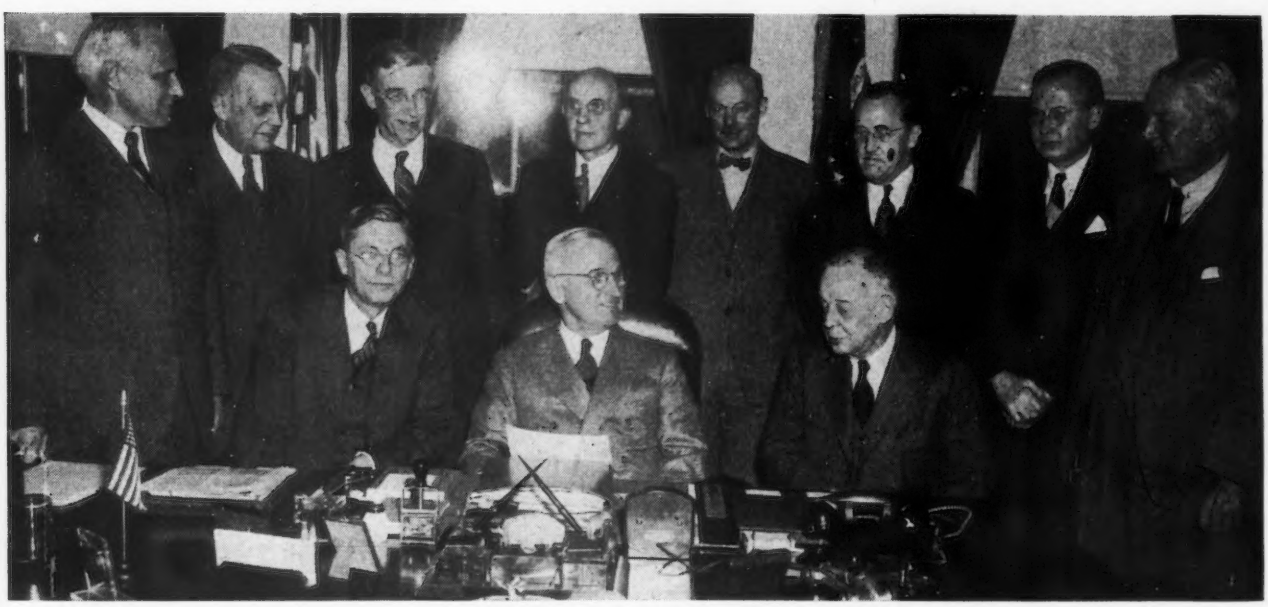
A great deal has been said and written on the favorable possibilities of an increase in production at present prices in absorbing an increase in labor costs. There is much misunderstanding on this point. In order to raise the total receipts of manufacturing corporations high enough to absorb a growth of $13.1 billion in the cost of goods sold, without raising prices, it would be necessary to produce and sell 19 pct more units of manufactured goods.

The possibility of an expansion of the peacetime demand for goods to a level requiring a rate of production reached only in wartime—and then briefly—appears remote.

At present levels of production and material costs any substantial rise in labor costs must inevitably be followed by an inadequate level of manufacturing profits or by further price rises. The possibilities greatly favor an immediate response in higher prices.

If higher prices follow higher wages, the position of the wage earner in terms of purchasing power is little, if any, improved and the situation of those dependent upon fixed income is greatly weakened. Moreover, the broad fluctuations in prices and business volume are not controllable by management. Insofar as higher prices restrict the market for goods, higher prices induce a shrinkage in production and therefore increase the possibilities of growing unemployment that must accompany a business recession.

SCIENCE GOES TO WASHINGTON: *A group of scientists who worked in connection with the executive office of the President through the office of Scientific Research and Development forming the National Defense Research Committee calling on President Truman. Front row, left to right, Dr. James B. Conant, president, Harvard University; President Truman; Dr. Alfred N. Richards, chairman of the committee of Medical Research, Office of Scientific Research and Development. Standing, left to right, Dr. Karl T. Compton, president of MIT; Dr. Lewis H. Weed, National Academy of Sciences; Dr. Vannevar Bush, director, Office of Scientific Research and Development; Dr. Frank B. Jewett, New York City; Dr. J. C. Hunsaker, MIT; Dr. Roger Adams, University of Illinois; Dr. A. Baird Hastings, Harvard Medical School, and Dr. A. R. Dochez, Columbia University, College of Physicians and Surgeons.*



Weekly Gallup Polls . . .

Strikes and Labor Troubles Are Biggest Problems

Princeton, N. J.

• • • **Strikes and labor** problems continue to hold public interest.

They are found topping a list of problems which the public views as needing solution by the government this year, according to George Gallup, director, American Institute of Public Opinion.

These findings come at a time when the Senate Labor Committee is holding hearings on labor legislation.

Second on the list is the problem of friendly international relations, including the need for a sound foreign policy, a program for controlling atomic energy, and assurance of lasting peace.

The problems which people view as important for the government to solve are rated by the number of persons mentioning them in reply to the following question — asked of men and women voters of all ages and in all walks of life, from Maine to California:

"In your opinion, what is the most important problem the United States Government must solve in the next year?"

The list:

	Pct
Strikes and labor problems	40
International relations, including atomic energy control, and friendly foreign policy	26
Inflation, high prices	13
Housing	10
Taxation	4
Employment	2
Shortages	1
Miscellaneous	10
No Opinion	4
	110*

*Replies total more than 100 pct because some gave more than one problem.

The top problems are of concern to Republicans and Democrats alike. It is particularly interesting to note that the problem of amicable international relations is a bipartisan concern not only in government circles, but also among the people. There is equal concern among Republicans and Democrats alike concerning the problem of international relations.

When replies of Republicans and Democrats in the survey are separated, a greater proportion of Republicans than Democrats are concerned about strikes and labor, but aside from this, the list of problems of both groups looks about the same.

Here are the top five problems as seen by Republican and Democratic voters:

	Rep. Pct	Dem. Pct
Strikes and labor probs.	47	36
International relations	24	25
Inflation, high prices	11	14
Housing	8	11
Taxation	5	3

•

• • • **Passage of a full year** has done little to eliminate the principal worries of the man-on-the-street in this country.

A year ago, a poll by the institute found the public's No. 1 worry was the high cost of living. Today the high cost of living continues to hold the No. 1 spot on the public's list of problems.

A year ago, the second biggest problem was housing. Housing emerges as the second most frequently mentioned problem on today's survey.

Shortages, third last year, are found in third place this year.

At regular intervals, field reporters for the Gallup Poll go about the nation's highways and byways asking people about the problems facing them or their families.

The question:

"What is the most important problem that you and your family face today?"

The top four:

(1) The high cost of living, high prices.
(2) Housing: Getting a proper place to live.
(3) Shortages: Household equipment, food, automobiles, etc.
(4) Personal family problems: Health, etc.

Other problems frequently mentioned include getting and keeping a job, farm problems, and the problem of financial security.

Worries of farmers, listed as farm problems, include the fear that the bottom will drop out of prices, that crops may not be good in the period ahead, that debts will prove overwhelming, etc.

The personal problems which they said they have on their minds include all kinds of things: personal health, health of a family member, getting the children to eat, having a baby, keeping a wife happy, getting rid of a bothersome mother-in-law.

One man said his greatest problem is to get his daughter, a polio victim, to walk again.

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• • • **In contrast to** the political ferment in some of the other nations of the world, the mood in the United States remains dominantly middle-of-the-road.

A majority of voters throughout the country say they want to see President Truman follow a policy, not to the right nor the left, but down the middle-of-the-road.

Moreover, the largest single bloc of voters are inclined to believe that President Truman is carrying out their wishes in this respect.

This may contain part of the answer to President Truman's remarkable comeback in public esteem. His personal rating with voters has jumped 16 percentage points since last October.

The present mood of the country was disclosed in the most recent check by the institute on a question asked periodically.

"Which of these three policies would you like to have President Truman follow:

(1) Go more to the LEFT by following more of the views of labor and other liberal groups.
(2) Go more to the RIGHT by following more of the views of business and conservative groups.

(CONTINUED ON PAGE 163)

High Prices, Housing And Shortages Continue as Top Family Problems of Public

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WAA Reports Steel Projects Disposal 63 pct. Completed

Gives List of Surplus Steel Plants Sold, Leased, And Awaiting Disposal

Washington

• • • **With 62 surplus** steel projects out of 146 declared surplus already in the hands of private industry, under sale or lease agreements, the War Assets Administration has reported that as of Feb. 1, the job had passed the 63 pct mark, based on original cost of the plants.

Forty-four projects which cost the government $497,789,325 have been sold. These sales brought the government $189,664,229. In addition, 18 projects costing $82,244,895 have been leased. This makes a total government investment of $580,034,220 in such undertakings on which disposal to private industry has been made.

Still to be disposed of are 84 surplus steel plants which cost $327,444,797. In addition, there are 63 Army-Navy and other projects under long term lease to the steel industry which cost $311,390,492 and have not as yet been declared surplus.

The complete list of steel projects sold, leased or to be sold appears at the right.

NHA Negotiates Contract

Washington

• • • **A guaranteed** market contract with the Clements Corp., Southport, Conn., for the production of 2500 metal-clad prefabricated houses in 1947 has been negotiated by the National Housing Administration.

A government loan of $1,100,000 has been authorized and approved by RFC, Expediter Frank R. Creedon said. Production is expected to start in April with 700 units scheduled for the second quarter.

Construction of the one-story units consists of fir plywood to which a thin sheet of steel is bonderized. Stainless steel will be used for the exterior surface and zinc-clad steel for the interior.

Prices are estimated to range from $6500 for the 720 sq ft size to $9000 for the 1040 sq ft model. Other sizes to be produced have a floor surface of 800 and 920 sq ft.

Projects Sold

War Operator	Cost	Sale Price	Purchaser
Carnegie-Illinois Steel Co. (three plants) Duquesne, Homestead, Braddock, Pa.	$120,181,621	$65,013,200	Carnegie-Illinois Steel Co.
Geneva Steel Co. Geneva, Utah	191,210,307	47,500,000 (including inventories)	U. S. Steel Corp.
Jones & Laughlin Ore Co. Benson Mines, N. Y.	6,914,122	4,000,000	Jones & Laughlin Ore Co.
Sheffield Steel Co. (part of) Houston	3,010,894	1,479,802	American Rolling Mill Co.
Inland Steel Co. East Chicago, Ill.	34,268,420	13,250,000	Inland Steel Co.
American Steel & Wire Co. Duluth	7,601,556	1,835,400	American Steel & Wire Co.
Pittsburgh Steel Co. Allenport, Pa.	763,705	361,996	Pittsburgh Steel Co.
Republic Steel Co. South Chicago, Ill.	91,608,795	35,000,000	Republic Steel Co.
Babcock & Wilcox Tube Co. Beaver Falls, Pa.	995,861	443,465	Babcock & Wilcox Tube Co.
Alliance, Ohio	2,824,395	1,315,794	Babcock & Wilcox Tube Co.
Timkin Roller Bearing Co. Newton Falls, Ohio	1,365,009	685,000	Standard Steel Spring Co.
Brown Fence & Wire Co. Adrian, Mich.	165,432	109,578	Service Steel Co. and Browne Fence & Wire Co.
Plymouth Steel Co. Detroit	49,141	47,323	Plymouth Steel Co.
Wallington Tube Co. Wallington, N. J.	1,991,219	903,000	Wallington Tube Co.
Pacific Tube Co. Los Angeles	2,494,582	1,665,000	Pacific Tube Co.
Shasta Coal Corp. Bicknell, Ind.	1,384,501	1,119,567	Shasta Coal Corp.
Tennessee Products Co. Chattanooga, Tenn.	1,697,039	600,000	Tennessee Products Co.
Basic Refractories, Inc. Maple Grove, Ohio	1,080,598	600,000	Basic Refractories, Inc.
Gladding-McBean & Co. Lehi, Utah	599,679	375,000	General Refractories Co.
Associated Iron & Metals Co. Oakland, Calif.	74,249	41,750	Associated Iron & Metals Co.
California Scrap Iron Co. Pittsburgh, Calif.	74,318	41,100	California Scrap Iron Co.
Cooper Alloy Foundry Co. Hillside, N. J.	351,067	132,500	Cooper Alloy Foundry Co.
Farrell-Check Co. Sandusky, Ohio	691,219	250,000	Farrell-Check Co.
Michigan Steel Castings Co. Detroit	171,793	106,106	Michigan Steel Castings Co.
Ordnance Steel Foundry Bettendorf, Iowa	3,470,820	1,049,139	Bettendorf Co.
The Osgood Co. Marion, Ohio	253,584	128,116	The Osgood Co.
Roxbury Steel Casting Co. Roxbury, Mass.	696,246	150,000	E. J. Belkin
Zimmerman Steel Casting Co. Bettendorf, Iowa	331,696	190,000	The S. & W. Corp.
Gunite Foundries Corp. Rockford, Ill.	195,044	107,209	Gunite Foundries Corp.
Joshua Hendry Iron Works Sunnyvale, Calif.	2,847,603	1,103,295	Joshua Hendry Iron Works
Maryland Sanitary Mfg. Co. Baltimore	1,674,118	600,000	Baltimore Castings Co.
General Malleable Corp. Waukesha, Wis.	905,420	550,000	International Harvester Co.
General Motors Corp. Danville, Ill.	2,261,761	1,587,910	General Motors Corp.
Chambersburg Engineering Co. Chambersburg, Pa.	350,848	159,948	Chambersburg Engineering Co.
Die Typing Corp. Pontiac, Mich.	297,778	92,617	Budd Wheel Co.
Utica Drop Forge & Tool Corp. Utca, N. Y.	282,671	136,904	Utica Drop Forge & Tool Corp.
Philadelphia Armor Plate, Plant No. 1 Philadelphia	709,954	300,000	Henry Disston & Sons, Inc.
Beryllium Corp. of Pa. Reading, Pa.	1,646,135	788,210	Beryllium Corp. of Pa.
Electro Metallurgical Co. Ashtabula, Ohio	9,003,634	5,150,000	Electro Metallurgical Co.
Superior Tube Co. Norristown, Pa.	534,374	435,000	Superior Tube Co.
Tennessee Products Co. Rockwood, Tenn.	597,817	200,000	Tennessee Products Co.
William P. Pollock Co. Youngstown	160,000	60,000	William B. Pollock Co.
TOTAL	$497,789,325	$189,664,229	

Note: Sales prices are only on such part of the projects disposed of; the cost prices are on entire projects.

Projects Leased

War Operator	Cost of Leased Projects	Lease Term	Lessee
Sheffield Steel Co., Houston	$ 819,415	20 years	Sheffield Steel Co.
Sheffield Steel Co. (part of second plant) Houston	10,557,491	20 years	Sheffield Steel Co.
Granite City Steel Co., Granite			

War Operator	Cost of Leased Project	Lease Term	Lessee
City, Ill.	12,697,088	5 years	Granite City Steel Co.
Granite City Steel Co.			
Jessop Steel Co., Washington, Pa.	1,569,148	5 years	Jessop Steel Co.
Zuni Milling Co., Los Lunas, N. M.	259,608	2 years	Zuni Milling Co.
Atlantic Steel Castings Co., Crum Lynne, Pa.	1,051,536	5 years	Chester Electric Steel Co.
Auto Specialties Mfg. Co., Benton Harbor, Mich.	3,713,595	5 years	Auto Specialties Mfg. Co.
Hercules Mfg. Co., Centerville, Iowa	165,586	4 1/3 years	Batavia Metal Products, Inc.
Ohio Steel Foundry, Lima, Ohio.	3,727,517	3 years	Ohio Steel Foundry
Unitcast Corp., Toledo	3,520,573	5 years	Unitcast Corp.
Albion Malleable Iron Co., Albion, Mich.	1,883,256	5 years	Albion Malleable Iron Co.
United Engineering & Foundry Co., Newcastle, Pa.	25,160,497	3 years	United Engineering & Foundry Co.
Kropp Forge Co., Chicago	2,136,298	5 years	Kropp Forge Co.
Ladish Drop Forge Co., Cudahy, Wis.	10,349,804	5 years	Ladish Drop Forge Co.
Utica Drop Forge & Tool Co., Utica, N. Y.	701,294	5 years	Utica Drop Forge & Tool Co.
Canton Drop Forge Co., Canton, Ohio	3,102,176	5 years	Canton Drop Forge Co.
Southern Ferro Alloy Co., Chattanooga, Tenn.	130,013	2 years	Southern Ferro Alloy Co.
Pittsburgh Coke & Chemical Co., Neville Island, Pittsburgh	700,000	3 years	Pittsburgh Coke & Chemical Co.
Total	$82,244,895		

Projects Remaining for Disposal

Eighty-four projects already declared surplus, remain, as of Feb. 1, 1947, to be sold or leased by War Assets Administration. They are:

War Operator	Cost
American Rolling Mill Co. (three plants), Middletown, Ohio.	$920,800
	784,899
	403,807
American Rolling Mill Co., Ashland, Ky.	74,700
Columbia Steel Co., Ironton, Utah	13,074,429
Columbia Steel Co., Dragerton, Utah	5,112,372
Crucible Steel Co. of America, Midland, Pa.	2,946,800
Pittsburgh Steel Co., Monessen, Pa.	7,152,197
Republic Steel Co.	
Cleveland	28,053,292
Warren, Ohio	7,393,514
Youngstown	9,132,946
Gadsden, Ala.	12,110,245
Canton, Ohio	293,000
Warren, Ohio	1,097,000
Sheffield Steel Co.	
Houston	18,370,472
Jacksonville, Fla.	987,059
McAlester, Okla.	6,034,470
Alan Wood Steel Co., Ringwood, N. J.	3,921,996
Youngstown Sheet & Tube Co., Indiana Harbor, Ind.	1,885,300
Allegheny-Ludlum Steel Corp., Dunkirk, N. Y.	4,740,300
Babcock & Wilcox Tube Co., Beaver Falls, Pa.	163,400
Copperweld Steel Co. (four projects), Warren, Ohio	9,560,745
	636,283
	1,772,875
	6,942,612
Rotary Electric Steel Co., Detroit	1,209,185
Superior Drawn Steel Co., Monaca, Pa.	280,552
Scotia Mining Co., Scotia, Pa.	763,500
Koppers United Co., Granite City, Ill.	8,075,563
Lone Star Steel Co., Daingerfield, Tex.	24,214,390
McCrossin Engineering Co., Rusk, Tex.	1,835,600
Wilkeson Products Co.	
Tacoma, Wash.	963,630
Wilkeson, Wash.	436,566
McLain Fire Brick Co., Wellsville, Ohio	247,356
Silica Products Oregon, Ltd., Eugene, Ore.	156,000
American Steel Foundries, Indiana Harbor, Ind.	26,137,759
Birdsboro Steel Foundry, Birdsboro, Pa.	1,448,000
Bison Castings, Inc., Buffalo	280,000
Blaw Knox Co., Pittsburgh	2,146,853
Chapman Valve Mfg. Co., Indian Orchard, Mass.	3,735,000
Columbia Steel Co., Pittsburg, Calif.	8,485,907
Continental Foundry & Machinery Co.	
East Chicago, Ind.	2,230,582
Wheeling, W. Va.	1,275,070

War Operator	Cost
Corapolis, Pa.	2,479,800
East Chicago, Ind.	5,806,600
Crucible Steel Castings Co., Milwaukee	2,041,500
General Alloys Co., Boston	125,500
Key Company, East St. Louis, Ill.	1,788,522
Lakey Foundry & Machine Co., Muskegon, Mich.	431,937
Lehigh Foundries, Inc., Easton, Pa.	1,461,302
McConway & Torley Corp., Pittsburgh	1,247,900
National Erie Corp., Erie, Pa.	542,122
Ohio Steel Foundry Co.	
Lima, Ohio	3,785,759
Springfield, Ohio	2,021,506
Lima, Ohio	174,699
Omaha Steel Works, Omaha, Neb.	641,430
Otis Elevator Co., Buffalo	3,245,993
Pacific Chain & Mfg. Co., Portland, Ore.	354,000
Pittsburgh Steel Foundry Co., Glassport, Pa.	6,689,400
Scullin Steel Co. (two plants), St. Louis	3,099,577
	12,627,211
Shofner Iron & Steel Works, Portland, Ore.	314,000
Symington-Gould Corp., Rochester, N. Y.	3,340,843
Pacific Car & Foundry Co., Renton, Wash.	2,920,761
General Metals Corp., Oakland, Calif.	1,990,000
Campbell-Wyant & Cannon Foundry Co., Muskegon, Mich.	2,864,000
Buffalo Brake Beam Co., Buffalo	870,000
Lake City Malleable Co., Inc., Ashtabula, Ohio	4,873,667
Barium Steel Co. (two plants), Canton, Ohio	716,300
	568,000
Champion Machine & Forging Co., Cleveland	3,826,989
Pittsburgh Forgings Co., Coraopolis, Pa.	262,068
Wyman Gordon Co. (four plants),	11,894,506
Harvey, Ill.	1,720,838
Worcester	1,063,000
	1,114,000
	49,000
Struthers-Wells Corp., Titusville, Pa.	2,098,000
Pittsburgh Ferromanganese Co., Chester, Pa.	1,148,762
Pittsburgh Metallurgical, Charleston, S. C.	1,000,407
Wenatchee Alloys, Inc., Rock Island, Wash.	1,461,163
Commercial Shearing & Stamping Co., Youngstown	507,316
Lukenweld, Inc., Coatesville, Pa.	3,210,893
National Carbon Co., Columbus, Tenn.	3,528,000
Total	$327,444,797

WAA to Handle Surplus In Territories of the U.S.

Washington

• • • **Disposal** of surplus personal property located in the territories and possessions of the United States, previously the responsibility of the Interior Dept., will henceforth be administered by the War Assets Administration. Arrangements have been made to effect the transfer immediately.

Property to be turned over to WAA was inventoried on Feb. 3 at approximately $167 million. Since July 1945, exclusive of real property, net declarations of surplus property have totalled about $278 million of which $111 million have been liquidated, Interior officials said.

Under the current agreement between the two agencies, Interior will retain disposal responsibility for mineral and grazing lands. However, on June 30, Interior will transfer to WAA disposal authority over such lands within the continental United States. WAA, in turn, will turn them over to the Agriculture Dept. for administration and disposal.

Neither agreement affects Interior's authority over surplus real property in the territories and possessions, including disposal of military installations, of which it is estimated that more than $500 million worth remain to be declared in Hawaii and Alaska alone.

WAA Opens Pipeline Bids

Washington

• • • **Eight bids which ranged** from $1 to $143 million for the Big Inch and Little Big Inch pipelines were opened and read Monday by the War Assets Administration.

They now go to the WAA real property board for analysis and action. Most of the offers stipulated that the lines were to be used for transmission of either or both natural gas and petroleum products, at the election of the buyer.

J. W. Crotty, Dallas, Tex., whose bid of $127 million last year was rejected, submitted an offer of 60¢ for the Big Inch and 40¢ for the Little Big Inch, cash with the bid.

Portsmouth Steel Corp. Earns 88¢ per Common Share Last Half 1946

Portsmouth, Ohio

• • • **Portsmouth Steel Corp.** reports a net income of $1,160,879.40 for the 6 months ended Dec. 31, 1946, equal to 88¢ per share of common stock. Net sales for the 6 month period totalled $16.886,-815.39. The company acquired the Portsmouth Works from Wheeling Steel Corp. on July 1, 1946, and began operations on that date.

E. A. Schwartz, president, has revealed that Portsmouth Steel has entered into several new long-term arrangements for the sale of a number of its products. A major portion of the company's welded wire fabric products will go to Truscon Steel Corp.

Under similar arrangements, Jim Brown Stores, Inc., The Farm Bureau Cooperative Assn., Inc. (Ohio), and the Indiana Farm Bureau Cooperative Assn., Inc., will take a major portion of Portsmouth Steel's fence production and a substantial part of the company's barbed wire, bale tie and nail production.

Also announced by Mr. Schwartz was the conclusion of a contract for 1947 with Apollo Manufacturing Corp., Apollo, Pa., for the conversion into sheet bar of ingots which Apollo will furnish. Portsmouth Steel will help manage the Apollo plant on a fee basis and will have the privilege of using its spare capacity to roll some of Portsmouth Steel's own sheet bars.

National Steel Earns $9.17

Pittsburgh

• • • **National Steel Corp.**, in a preliminary statement subject to final audit, reports net earnings for the year 1946 of $20,461,651 equivalent to $9.17 per share. This compares with earnings for 1945 of $11,117,764, or $5.04 per share.

Net earnings for the fourth quarter of 1946, were $6,520,331, equal to $2.92 per share, compared with earnings of $2,207,091, equal to $1.00 per share, in the final quarter of 1945.

Lukens Profits Advance

Coatesville, Pa.

• • • **Lukens Steel Co.** and subsidiaries, By-Products Steel Corp. and Lukenweld, Inc., for the first quarter of their 1947 fiscal year which ended Dec. 28, 1946, reported a consolidated net profit of $600,050, before provision for current income taxes of $240,000, Robert W. Wolcott, president, announced recently.

This is in contrast to a deficit for the corresponding first quarter of the 1946 fiscal year of $448,279, before estimated tax recovery, due to carry-back provisions of the Internal Revenue Code, of $291,350.

Sales, net of discounts, returns and allowances for the first quarter of 1947 totaled $8,802,887 in contrast to $6,626,247 for the first quarter of 1946.

To Up Production Of Dead Burned Dolomite

Cleveland

• • • **Production of** dead burned dolomite materials by Basic Refractories, Inc., will be increased about 30 pct as a result of the purchase and expansion of the plant at Maple Grove, Ohio, which the company designed and built for the Defense Plant Corp., according to Harvey N. Barrett Jr., assistant to president Howard P. Eells.

Mr. Barrett said Basic Refractories recently made a $1,500,000 loan to purchase and expand the plant, where the company plans to centralize its dolomite refractories manufacturing operations in the future.

When the expansion program is completed, the plant will have two large rotary kilns 11 ft 3 in by 328 ft which will handle the three general classes of refractories products, dead burned dolomite, magnesia hearth refractories and gun refractories. McDonald Engineering Co., Chicago, is the principal contractor in the building and erection of the new facilities.

Coming Events

Feb. 17 Chicago World Trade Conference, Chicago.
Feb. 18-20 Magnesium Exhibition, Wright Field, Dayton, Ohio.
Feb. 20-22 American Foundrymen's Assn., congress and exposition, Birmingham.
Mar. 2-5 American Society of Mechanical Engineers, spring meeting, Tulsa, Okla.
Mar. 6-8 National Assn. of Foremen, annual national conference of educational directors in industry, Cleveland.
Mar. 17 American Institute of Mining & Metallurgical Engineers, world conference on mineral resources, New York.
Mar. 17-19 American Society of Lubrication Engineers, annual meeting, Pittsburgh.
Mar. 17-19 American Gas Assn., sales conference, Boston.
Mar. 17-19 Chicago Technical Societies Council, production conference, Chicago.
Mar. 19-22 American Society of Tool Engineers, annual meeting, Houston.
Mar. 22 Western Metal Conference and Exposition, American Society for Metals, Oakland, Calif.
Mar. 24-25 American Machine Tool Distributors' Assn., spring meeting, Chicago.
Mar. 31-Apr. 2 Midwest Power Conference, Chicago.
Apr. 7 Packaging Machinery Manufacturers Institute, semiannual meeting, Philadelphia.
Apr. 7-10 National Assn. of Corrosion Engineers, convention, Chicago.
Apr. 8-11 American Management Assn., packaging exposition, Philadelphia.
Apr. 14-16 National Machine Tool Builders' Assn., spring meeting, Atlantic City, N. J.
Apr. 29-May 1 Industrial Packaging and Materials Handling Exposition. Industrial Packaging Engineers Assn. of America, Chicago.
May 6-10 Society of the Plastics Industry, Inc., exposition, Chicago.
May 15-17 Society for Experimental Stress Analysis, annual meeting, Chicago.
May 27 Metal Powder Assn., spring meeting, New York.
June 9-11 American Coke & Chemical Institute, annual meeting, French Lick, Ind.
June 16-20 American Society for Testing Materials, annual meeting, Atlantic City, N. J.
June 17-19 Machinery Dealers National Assn., convention, Cincinnati.

The London ECONOMIST

Finland's Ordeal

THE long-awaited peace treaty is not likely to make life any easier for the Finns. It will bring no alleviation of the armistice terms under which they have been existing with such difficulty for the last 28 months.

The territorial clauses are unchanged: Russia retains Petsamo, the Porkkala area and the province of Karelia, which includes Viipuri, Finland's second city, part of the Saima Canal, her main industrial artery, and land which produced 12 pct of her cereals and meat and 10 pct of her industrial output.

The military clauses are made more severe: Finland must surrender all armaments in excess of those needed by a standing army of 34,000 men. The reparation bill is not reduced: It remains at $300 million worth of goods to be delivered by September 1952.

This reparation burden, which Finland has been shouldering since the armistice of September 1944, is a great deal heavier than may appear at first glance. The Russians insist that reparations-goods be valued at the price level of 1938 (with additions of 10 or 15 pct in some cases), which means that the cost to Finland is greatly in excess of $300 million.

The nature of the goods required and the dates for their delivery are specified in the closest detail. Only one third of them are forestry products, although these formed 80 pct of Finland's prewar exports. The rest is to be paid in ships, cables and machinery, which before the war made up only 4 pct of Finland's exports. Nearly one third of the bill is to be paid in machinery, which Finland has never manufactured before and for which she must import the raw material. To pay for these imports Finland has little surplus available for export: She must have credits from the West.

Meanwhile, if the Western Powers fall behind schedule in their deliveries to Finland, the Finns must be late in their deliveries to Russia. Finland is not allowed to make up for a deficit in deliveries of machinery by sending a surplus of wood-products; each category of reparation-goods must be sent in full, and delay involves a fine of 60 pct per annum. Apparently Finland is now late in deliveries of machinery and ships to the value of $4 million; for this she incurs a fine of $200,000 a month.

THUS saddled with reparations, the Finns have been able to do little for their own economic rehabilitation during these last years. They have been shockingly short of food, especially of meat, sugar and fats, and the position is getting no better; indeed, this month when the bread ration is to be reduced, it will get worse. Transport, deprived of coal, coke and petrol, and with no renewal and little repair of rolling stock, is in a critical position.

The housing shortage is appalling: The Finns are now short of 140,000 dwellings. Finland exported nearly 60,000 tons of prefabricated houses in the last quarter of 1946, but so little can be spared for domestic building at home that a maximum allowance of one room per person is imposed in the Finnish towns.

The Finns are united in the effort to pay reparations, and all are agreed that good relations must be maintained with Russia. Except for the Communists, they are as suspicious and distrustful of Moscow as ever they were; all they have learned is that they cannot afford to pursue a policy of isolation from Russia.

The Finnish Communists are not in a strong position: They know that they cannot do without Russia, and that Russia has so far been able to do without them. They have made themselves useful to Moscow in small ways — a demonstration here, a procession there, a press agitation on this point, a trade union concession on that—but Russia has had her way with Finland without their help.

In her policy towards Finland, the only really democratic country which she has ever defeated, Russia has behaved with remarkable subtlety. There has been no military occupation, no NKVD penetration, no planting of ex-Comintern agents in key positions, no deluge of propaganda. The Finnish press has been left free, provided that it does not criticize the Soviets. The Finnish general election of March 1945, was the freest as well as the first to be held in any defeated country. The Finnish Government, though prodded behind the scenes by the Control Commission and by the Soviet Foreign Ministry, has ostensibly been left alone to carry out the armistice terms.

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THE result is a strange mixture of freedom and fear in the country. It is still democratic, Scandinavian in character and outlook, and western in all its aspirations. Culturally and politically the Finns speak the same language as the Swedes and the English. All their reforms of the postwar years —in education, in land settlement, in labor conditions—have been on western rather than on eastern lines. They know that they are at the mercy of Russia, and that the quality of Russian mercy is strained; but while there is life there is hope. The Finns' hope is based on the fact that their peace treaty must be signed and guaranteed by Great Britain as well as by Russia.

Just recently there have been signs that the Russians may use a lighter hand in Finland. They have released the Malm airfield for Finnish use, on condition that the Finns do not arrange any air service to foreign countries. They have agreed in principle to Finnish requests to use the Saima Canal for timber transport and to reopen the direct Helsinki-Abo railway, which

(CONTINUED ON PAGE 164)

Outlines Engineer Corps Program of Civil Works for 1947-48

Chicago

• • • **Lt. Gen. Raymond** A. Wheeler, chief of engineers, U. S. Army, in a talk before the 28th annual convention of Associated General Contractors of America, in Chicago, outlined the corps' program for the years 1947 and 1948. General Wheeler stated, "In all civil activities conducted by the Federal Government in the interest of improved water transportation, expanding commerce and the production and needs of our people; Congress has placed the responsibility of execution upon the corps of engineers.

"For, while the primary mission of the army engineers is to aid in assuring the success of that nation's military effort in time of war, the carrying out of civil works assignments is its important peacetime mission." The speaker informed the group that the program of civil works for the current fiscal year was drastically reduced last August by curtailment of expenditures. Originally, the 1947 fiscal year's appropriation for civil works was $308,845,250, of which $194,315,000 was for flood control, and the balance for rivers and harbors.

To Spend $190 Million for Flood Control; $150 Million For Rivers and Harbors

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General Wheeler went on to say "It now looks as though we will spend during this fiscal year approximately $295 million of which $190 million will be for flood control, and $105 million for rivers and harbors. These expenditures represent money appropriated for the current fiscal year, or appropriated previously and carried over into the 1947 period."

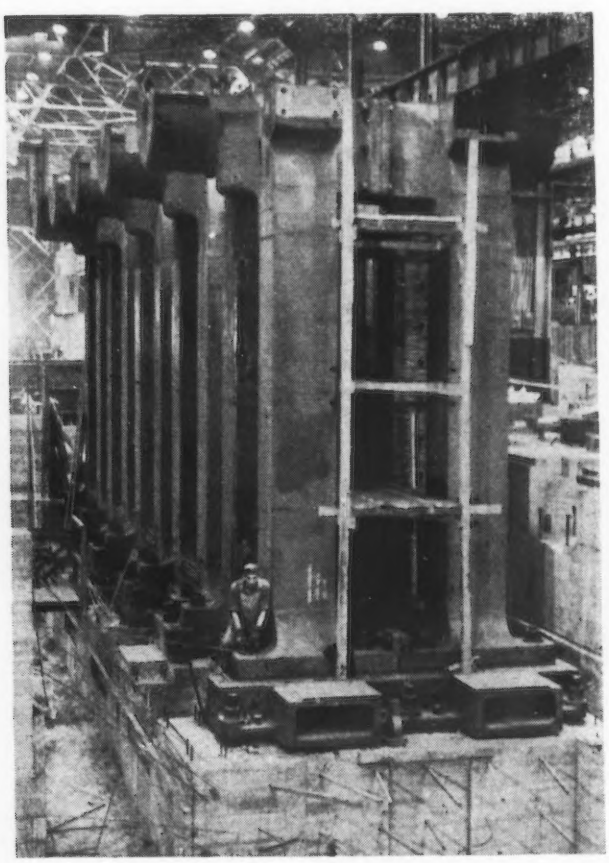
The head of the army engineers stated that "During this fiscal year, we will have started or resumed construction on 85 of the 153 flood control projects for which Congress has appropriated funds since the end of the war. Approximately 27 river and harbor projects were undertaken during the current fiscal year, including such operations as the dredging of New York harbor; dredging and rock removal in the New York and New Jersey channels; initiation of the chain of rock project on the Mississippi and Missouri Rivers."

Earmarked for the 1947 program are 68 flood control projects which, the speaker said, are expected to be started in the spring or early summer. There are also 35 river and harbor projects held up, which also may be started this year. "Civil works appropriations for the 1948 fiscal year are, of course, as yet unknown," General Wheeler said. The president has recommended that $290,350,000 be appropriated for the 1948 fiscal year. Of this amount, $188,356,000 would be for flood control, and $101,994,000 would be for river and harbor development.

The $188,356,000 which the president's budget message recommends for flood control includes $163,356,000 for general flood control projects, $24 million for the Mississippi River and tributaries, and $1 million for the Sacramento River in California.

General Wheeler told the assembly that "Approximately 76 flood control projects underway at the present time are covered in the budget recommendations for the 1948 fiscal year. Their continuation," he said, "will necessitate the awarding of many new contracts." Similarly 36 river and harbor projects will be included in the program for the 1948 fiscal year.

The contemplated expenditures call for continued improvements of the New York and New Jersey



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CAPACITY IN THE MAKING: *Stands for large tandem cold reduction strip mill being bolted down in the 48-in. wide strip steel department at Weirton Steel Corp. When completed the unit will be Weirton's fastest, turning out strip at the rate of 5000 fpm.*

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channels, the Gulf Intra Coastal Waterway below Corpus Christi, Tex., the Mississippi River at the Chain of Rocks, the Missouri River waterway, and the McNary Dam on the Columbia River in Washington and Oregon. General Wheeler disclosed that the Army had a backlog of military construction totaling over a billion dollars. These projects are becoming increasingly essential to the efficient performance of military missions, but it is recognized that the undertaking of any major portion of this program must give precedence to more urgent civil construction needs.

The speaker said, "For 1947 the construction program for the Army is estimated at $60 million. Housing construction will account for $41 million of this total, with the greatest part of the balance going to research projects. Apart from housing, and for construction required for research undertaking, only those projects essential to health, safety, education or necessary services have been authorized for the Army building program."

Currently, the corps of engineers is initiating a new program of dismantling surplus installations and releasing the resulting materials to the military construction program. In this manner, the amount of new materials that the Army otherwise would have to obtain in the open market for this work is greatly reduced. Materials will be used principally in the conversion of existing barracks and other suitable buildings to family quarters, with the view to removing families of officers and enlisted men from civilian quarters in towns near the Army camps. Some of the materials, the general reported, will be utilized at Pacific bases to reconstruct housing for the troops as well as for the families of Army personnel.

In closing, the distinguished speaker pointed out that, "in all of these activities, we like you in the construction industry, are striving to build a greater America. The vast water resources with which this nation is endowed have been continuously improved to produce a network of connected rivers and canals, and harbors and lakes, that will better serve the needs of the American people through generations unborn. As Congress authorizes us, we will continue to work with you in the building of an ever greater America."

C. E. Wilson Offers 10-Point Program For Labor Law Changes

Washington

• • • **A 10-point program,** designed to offer a working basis for approaching the problem of revising labor laws so as to make strike threats remote, has been submitted to a Senate Labor subcommittee by Charles E. Wilson, president, General Motors Corp.

Strikes last year cost GM employees more than $200 million in lost wages, the government more than $60 million in taxes, and the car-buying public at least a million GM cars and trucks, the corporation executive declared.

Many of the present difficulties arise from the fact that some of the ideas back of existing labor laws, or read into them, have been imported from abroad where both labor conditions and objectives are different from those in this country, Mr. Wilson said.

Keynoting the Wilson recommendations are the proposals to ban industry-wide strikes and work agreements, to place equal responsibility upon labor and management, and to provide adequate protection for the rights of all individuals, both employees and employers.

Other points which the automotive manufacturer said must be given close consideration in enacting effective new legislation or successfully revising the old are:

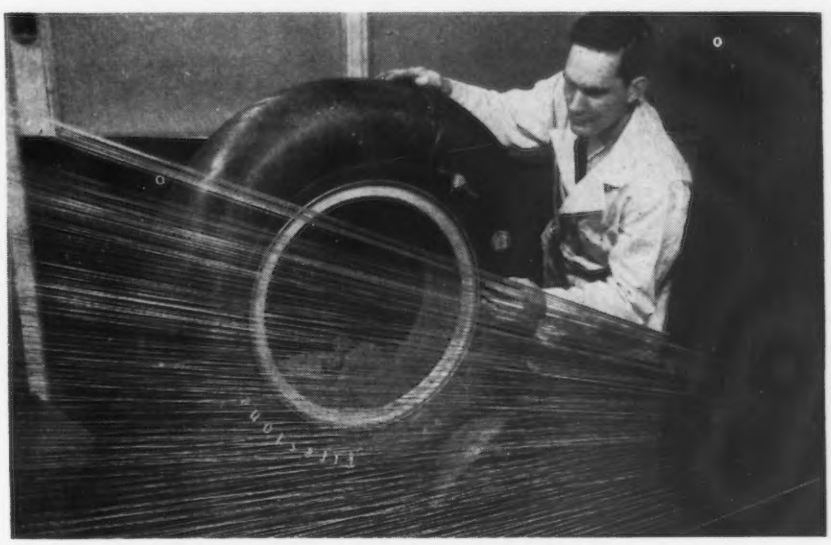
Clarification of what is meant by collective bargaining; banning affiliation of managerial or supervisory employees with worker unions; prohibiting compulsory union membership as a condition of employment; outlawing of secondary boycotts and sympathy strikes; provision of penalties for jurisdictional strikes after a conciliator has been called in; forbidding featherbedding; and clearly outlining in all collective bargaining agreements the conditions under which legal strikes may be called.

If the National Labor Relations Board is left in the picture, Mr. Wilson declared, its functions should be changed by law so that it does not act in the triple capacity of prosecutor, jury and judge.

In defining collective bargaining, he said, the law should be specific in three ways—by clearly defining the term, by establishing minimum procedures to be followed by employer and employee, and by determining the legal scope of collective bargaining.

Compulsory membership in a union was described as being as bad on one side as the "yellow dog" is on the other—both violating the basic rights of individuals. In addition, Mr. Wilson regarded the closed shop as clearly monopolistic.

BLOWOUTS OUTLAWED: *By substituting high tensile steel wire for fabric cords, Firestone engineers have produced a rugged tire for heavy duty hauling. A* 9.00 *x* 20 *four-ply wire cord tire contains more than* 55 *miles of* 0.0058-*in. diam strands combined to form* 0.035 *in. diam cords.*



Industrial Briefs...

• CAMCO MOVES—The Cleveland Automatic Machine Co., after more that half a century of operation at the scene of its start in Cleveland, has been moved to new headquarters in Cincinnati, where its permanent address will be 4932 Beech St. Business and sales offices were moved early in January and moving of plant equipment and personnel is expected to be completed by early March. This marks the completion of a change started in 1944 when control of Camco was purchased by the LeBlonds of the R. K. LeBlond Machine Tool Co., Cincinnati, makers of a complete line of lathes. Harold R. LeBlond became president of Cleveland Automatic at that time. In September of 1946 The LeBlond Engineering Co., which he also heads, was merged into the Cleveland Automatic Machine Co.

• TRACTOR PLANT—Harry Ferguson, Inc., Detroit, has purchased the Cleveland Pneumatic Aerol plant here, according to an announcement by WAA. Production of tractors is expected to get underway this summer. Initial production schedules call for about 400 tractors a day with a labor force of 1200.

• MIT HEAD HONORED — The Washington Award in recognition of devoted and pre-eminent service of human progress will be conferred upon Dr. Karl T. Compton, president, Massachusetts Institute of Technology, by the Western Society of Engineers, on Feb. 26, Chicago. As president of MIT, his contributions in the field of administration include notable developments in the program of scientific and engineering education, and fundamental research.

• TO BUILD FURNACE — A continuous slab heating furnace to heat steel alloy billets prior to rolling will be built for Allegheny Ludlum Steel Corp., at Brackenridge Pa., by the Rust Furnace Co. Pittsburgh.

• SALES OFFICE—M. L. Murray, who has been identified with the wire business for over 40 years, has opened a sales office at 3653 N. 15th St., Philadelphia, and has been appointed a representative of the Bellis Heat Treating Co.

• NEW COMPANY—United Chromium Ltd., a subsidiary of United Chromium, Inc., has been formed to meet the increasing demand in Canada for Unichrome processes and materials. Offices are located at Toronto, Canada, where James Guffie will be in charge as manager.

• EXPORT AGENT — American Steel Export Co., New York, have been appointed exclusive export agents by the Canedy-Otto Co., Chicago Heights, Ill., for their line of precision drilling equipment. The new agents will handle all sales and shipments to foreign countries all over the world.

• NEW WELDING PLANT — The Harnischfeger Corp. of Milwaukee is now operating their new plant at Escanaba, Mich., where they are manufacturing smaller types of welding machines.

• LEASES MACHINE SHOP—National Can Co. of New York has leased a machine shop, part of the Alcoa aluminum forging plant at Canonsburg, Pa., from the government for a period of 5 years at a rental rate of $35,302 a year.

• WAA BOOKLET—In order that business oencerns and individuals may know how to go about acquiring surplus government property, the WAA has compiled a booklet to guide them. Entitled "How to Buy or Lease Surplus Real Estate," it lists the available types, gives the data which must be submitted to WAA, and summarizes the rules and regulations covering disposals. Copies may be obtained from regional offices.

Employment Service In Pennsylvania Reports Drop in Job Openings

Pittsburgh

• • • **Despite the fact that employment in this area reached a postwar peak in December 1946, comparable to the wartime employment peak of December 1943, the Pennsylvania State Employment Service points out that there are 32,500 unemployed in the district and only 1600 current job openings on file at the bureau.**

By late January employment in Allegheny County had started to decline because of seasonal layoffs in trade and construction activities; because of plant layoffs resulting from material shortages; and because a few plants are removing all or part of their operating units to other districts outside Allegheny County or the state. Also, there is a noticeable trend that has not yet become general in the layoffs occurring in plants and wholesale houses. This is the result of the reluctance of retailers, in view of price uncertainties, to build up stocks.

No substantial employment gains are anticipated by the PSES, but employment prospects in construction are likely to be better in 1947 than the 1946 peaks. Likewise, the potential demand for railroad equipment is expected to result in manufacturers recalling furloughed workers as soon as materials become available. Some industries anticipate a moderate expansion, but most plants are already staffed for record volume output. The general present employment pattern indicates that minor layoffs are occurring in many plants because of the shakedown in working forces.

The low of 1600 current job openings on file at the PSES office in Pittsburgh in mid-January continues the declining of job openings started several months ago. In 1946, 25,500 were placed on jobs by PSES referral to openings listed by employers with the Pittsburgh office of PSES. In Allegheny County, 18,700 veterans are currently collecting Servicemen's Readjustment Allowances and the Unemployment Compensation rolls total 13,800, making a total unemployed roster of 32,500.

Construction Steel . . .

• • • **Fabricated steel awards** this week included the following:

700 Tons, Tecumseh, Kan., extension to power plant for Kansas City Power & Light Co. to Bethlehem Steel Co., Bethlehem.

140 Tons, Harvey, Ill., Little Calument River bridge for Illinois Central R.R. to American Bridge Co., Pittsburgh.

140 Tons, Aboca, Iowa, bridge for Chicago Rock Island & Pacific R.R. to American Bridge Co., Pittsburgh.

• • • **Fabricated steel inquiries** this week included the following:

13,000 Tons, Buffalo, N. Y., two veterans' hospitals, one at Buffalo and the other at Albany, U. S. engineers. Proposals will be opened Feb. 17. Previously listed Feb. 6 as opening date for bids.

4000 Tons, Alexandria, Va., previously reported 2500 tons, 160,000 kw power plant for Braddock Light & Power Co., Stone & Webster Engineering Corp., Boston engineers.

1600 Tons, Smithbluff, Tex., grease plant for Pure Oil Co., Chicago.

1000 Tons, Los Angeles, boiler supports, boiler installation by Riley Stoker Co., Worcester, Mass., for city.

500 Tons, Carneys Point, N. J., E. I. du Pont de Nemours Co., building, Feb. 13.

345 Tons, Racine, Wis., St. Catherine's high school building.

300 Tons, Chicago, alterations to Edison Building for Commonwealth Edison Co.

240 Tons, Sioux City, Iowa, building for Metz Bakery.

220 Tons, San Bernardino Co., Calif., two steel beam span bridges at San Timoteo Creek and Santa Ana River on Waterman Ave., California Div. of Highways, Los Angeles, bids to Mar. 6.

150 Tons, West Chester, Pa., Denney Tag Co. building, bids in.

140 Tons, Franklin County, Pa., bridge for Pennsylvania Dept. of Highways, Mar. 7.

105 Tons, Colorado Springs, Col., underpass on state highway No. 1, State Highway Engineer, Denver.

100 Tons, Crawford County, Pa., highway overpass for Pennsylvania Dept. of Highways, Mar. 3.

• • • **Reinforcing bar awards** this week included the following:

730 Tons, Wilmington, Calif., substructures, Harbor Steam Plant, Los Angeles Dept. of Water and Power, Spec. 9689, through Guy F. Atkinson Co. to Blue Diamond Corp., Los Angeles.

225 Tons, Cambridge, Mass., manufacturing plant for Robert Gair Co., Inc., to Truscon Steel Co. through Thomas O'Connor & Co., Cambridge, contractor.

120 Tons, Urbana, Ill., electrical engineering building for University of Illinois through John Felmley to Bethlehem Steel Co., Bethlehem, Pa.

100 Tons, Chicago, commissary building for Santa Fe R.R. to J. T. Ryerson & Son, Chicago.

• • • **Reinforcing bar inquiries** this week included the following:

1000 Tons, Odair, Wash., Inlet Feeder Canal, Columbia Basin Project, Bureau of Reclamation, Denver, Inv. G-38,234-A.

1000 Tons, Adrian, Wash., West Canal, Columbia Basin Project, Bureau of Reclamation, Denver, Inv. G-38,235-A.

300 Tons, Madison, Wis., highway project, State Highway Commission.

205 Tons, Urbana, Ill., mechanical engineering building, University of Illinois, all bids rejected.

190 Tons, Hornbrook, Calif., bridge across Cottonwood Creek and underpass, California Div. of Highways, Sacramento, bids to Mar. 5.

130 Tons, Dryden, Wash., bridge across Wenatchee River on state highway No. 2, Director of Highways, Olympia, bids to Feb. 18.

105 Tons, San Bernardino Co., Calif., two steel beam span bridges at San Timoteo Creek and Santa Ana River on Waterman Ave., California Div. of Highways, Los Angeles, bids to Mar. 6.

• • • **Pipe awards** this week included the following:

19,000 Tons, Garden City, Kan., 4 to 22-in. pipe gathering system for Stranolind Corp. to numerous suppliers and involving invasion pipe, Stone & Webster Engineering Corp., Boston engineers.

• • • **Paving mesh inquiries** this week included the following:

270 Tons, Marshall County, Ill., paving project, F-5 State Highway Commission.

175 Tons, Jackson County, Ill., paving project F-15 State Highway Commission.

• • • **Railroad car awards** this week included the following:

The 500 50-ton box cars ordered by New York, New Haven & Hartford R.R. which was placed with Pullman Standard Car Mfg. Co. will be built at Michigan City, Ind. The Seaboard Airlines R.R. has placed an order for 175 covered hopper cars with Pullman Standard Car Mfg. Co. at Butler, Pa. The B&O R.R. has placed orders for 4000 50-ton steel hopper cars, 2000 placed with Bethlehem, 1000 with American Car & Foundry, 500 with Pressed Steel Car Co. and 500 with Ralston Steel Car Co. The 800 50-ton box cars ordered from Pullman by Kansas City & Southern R.R. was divided between the Michigan City and Butler plants with each building 400 cars. The 200 pulpwood cars ordered by the Central R.R. of Georgia will be built at the Butler plant of Pullman Standard Car Mfg. Co. Erie R.R. placed orders for 25 diesel electric switching engines. Eleven units were placed with American Locomotive, 10 with Electro Motive, and 4 to Baldwin Locomotive Co. The Budd Co. of Philadelphia has received an order for eight all stainless steel railway cars for the Missouri Pacific R.R. The order consists of four de luxe day-and-night coaches, two diner-lounges, and two sleepers.

• • • **Railroad car inquiries** this week included the following:

The Missouri-Kansas-Texas R.R. has requested bids on $3,900,000 equipment trust certificates to provide in part funds required for the acquisition of the following equipment to cost not less than $4,875,000: one 4000 hp diesel electric passenger locomotive, seven 4500 hp diesel freight locomotives; one each mail baggage car, coach lounge buffet car and observation-lounge-sleeper; three coaches, and seven sleepers. Bids opened Feb. 11.

Natural Gas Shortage Cuts Steel Production In Pittsburgh Area

Pittsburgh

• • • **The shortage** of natural gas in the Western Pennsylvania-West Virginia area sent industrial unemployment soaring to nearly 100,000, and caused critical domestic situations in many towns. As the week opened, U. S. Steel Corp. had shut down about 16 openhearths in the Pittsburgh district, 11 at the American Steel & Wire plant at Donora and 5 at the Vandergrift plant of Carnegie-Illinois. Allegheny-Ludlum, likewise, trimmed openhearth production.

The lamp plant of Westinghouse Electric Corp., at Fairmont, W. Va., shut down on Feb. 5, and various industrial concerns throughout the area had to cut back operations to the point that layoffs were mounting. Foundries were particularly hit because the bulk of the foundries utilize gas either in heating furnaces or in core drying ovens. Even when they have oil burning equipment in one phase of the operations, if gas is required at all it holds up the entire shop.

Typical is Mackintosh-Hemphill Co., with foundries at Midland and Pittsburgh, where fuel oil is used in heating furnaces and gas is used in drying ovens. At these plants 300 foundry workers were furloughed and unless relief is quick the machine shops will be out of work because of lack of material coming through.

National Supply Co. had to curtail all of its operations to some extent, with the Etna, Pa., continuous welded pipe mill closing down and the Ambridge plant curtailed to what operations could be maintained with oil. Some 1200 have been furloughed by this company alone.

Hanlon Gregory Galvanizing Co., Pittsburgh, while it has had no layoffs, early this week had to cut its operations to less than 50 pct because of the gas shortage, and Mesta Machine Co.'s layoffs are mounting steadily.

Oliver Iron & Steel Corp. unemployment jumped to about 1200 at the beginning of last weekend, and practically all fabricating plants anticipate extensive layoffs within the next two weeks. One real threat is that the gas shortage will cut steel production to the point that layoffs in fabricating plants will be accentuated.

Gas supplies to commercial and industrial users were cut as much as 75 pct in 32 Ohio Valley communities. While industry breathed a sigh of relief when steel union contract negotiations proceeded with record smoothness, the relief was shortlived because the gas shortage has threatened to hit industrial production as hard as a strike.

MACHINE TOOLS

. . . News and Market Activities

Mammoth Machine Tool Show Planned by Association

• • • **With space in** the Chicago-Dodge plant now a historic fact, plans for probably the most colossal machine tool show of all time are being jelled by the National Machine Tool Builders Assn. Hotel rooms in Chicago, Sept. 16-26, are already in high demand and the race to get ready is under way in the industry.

Developments of the past week suggest that the show is going to make an ideal focal point for machine tool builder energy during the next few months. According to qualified sources, new orders are down; some segments of the industry are laying off men and reducing the shop week from 5 days to 4 and the State Dept. as a crowning blow has decided to give its blessing to the return to this country of U. S. machine tools now overseas.

Avowed reason for this move is that "they are essential to the reconversion of U. S. industry." The list includes lathes, milling machines, boring mills and other items generally considered to be available from WAA, which has about $1 billion machine tool inventory at the moment. These machine tools were sent or carried abroad by some of the services and some of the various government agencies during the war and most sources presumed that these tools would eventually find their way into foreign shops. This, apparently, is not the case and the ultimate effect of the State Dept.'s move as well as what or who is behind it are among the more speculative unknowns at the moment. It will be a surprise to many segments of the trade, however, if these tools can be returned to this country and sold at prevailing prices with anything approaching a profit.

At the same time, other segments of the machine tool industry are expressing grave doubts as to the fertility of foreign markets in even the near future. Most statements of demand imply that foreign buyers will continue to absorb their present rate or about 30 pct of the industry's shipments. But most planning in foreign countries, particularly France, is in the direction of self-sufficiency and UNNRA is dead. While South America is generally considered ripe, the position the new Congress takes on tariffs and reciprocal trade agreements is still to be determined so far as it may affect the machine tool industry.

State Dept. Announces Plan To Return Overseas Machine Tools

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The machine tool industry in Cincinnati indicates that though business is at approximately the same level as it has been for the past several weeks, there is still difficulty in obtaining some parts, particularly all types and sizes of horsepower motors.

The Wolf Machine Co. plans to start work in the next few months on a new plant to more than double its present space and enable the company to take better care of the present large demand for its products. Wolf Machine Co. manufactures electric cloth-cutting machines used by the automobile industry as well as other industries in the textile field. The new building is expected to be completed by the end of 1947.

A recent survey by the Automotive Tool & Die Manufacturers Assn. shows ordering of standard machine tools in DETROIT at low ebb and ordering of special machines only modestly better. Only odds and ends of recent outstanding tooling programs are left, the agency said, and there is substantial competition for available work. There is, however, definite expectation that new programs will be released in the very near future, thus bolstering sagging order banks.

The ATDMA also pointed out that Detroit metal pattern shops are working at capacity and Ford Motor Co. is advertising for metal patternmakers. Among wood patternmakers activity is perhaps 10 pct less than capacity on an overall basis with little chance of pickup for 45 to 60 days.

Under terms of the recent contract with AFL patternmakers' union, metal patternmakers in Detroit receive $2.55 per hr and wood pattern workers receive $2.75 per hr.

In Boston and the East, representatives of tool manufacturers who were decidedly down in the mouth in January are on their toes. They have some hot tool leads and inquiries for tool parts and accessories. Tool makers themselves are booking orders despite drastic price slashing on surplus equipment. January was a better month than many anticipated.

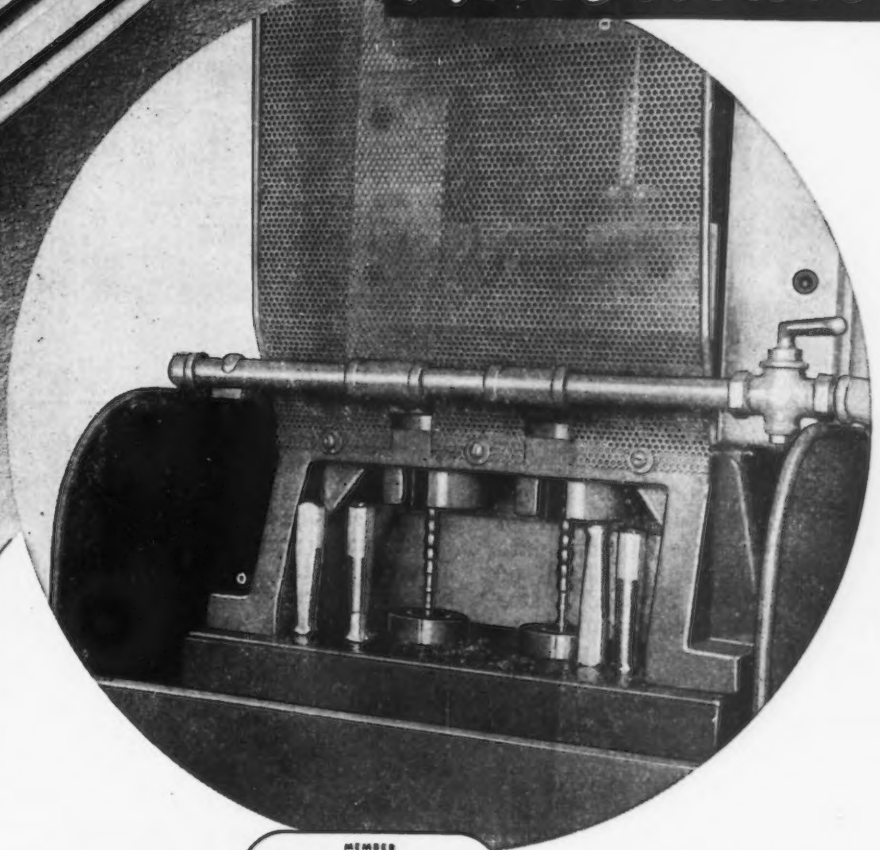
Manufacturers of tools and machinery are having get-together meetings to brush up on technique in developing export markets. Those with European plants are strengthening personnel. Bankers are being consulted about credit extensions. New England interest in foreign markets is growing and reports, as yet unconfirmed, has it that Chile, if successful in establishing United States credit, will buy steel mill machinery and metalworking equipment.

•

• • • **A 12½ pct** discount on machine tools, previously recommended by the Metalworking Machinery & Equipment Industry Advisory Committee, has been granted by the WAA. It will apply to machine tool rebuilders, manufacturers, exporters, dealers or other distributors who are purchasing for resale.

Approved dealers will continue to receive the customary 12½ pct commission for their services; however, if such dealers buy for their own account, they will receive the discount and not the commission.

Kirsten BROACHED BY ★ American



Accuracy and smooth finish are required for the holes in Kirsten pipe radiators and cigarette holder bodies. Close tolerances are needed to fit the arbor for subsequent milling operations on the stem exteriors. Smooth finish is likewise important on inner bores. All these specifications—*plus* an extremely high rate of production—are met in broaching by *American.*

Kirsten master mechanics use the popular *American* T-4 type Broaching Machine, one more example of the many ways in which broaching by *American* can be applied to a wide range of metal working problems.

FOR ALL YOUR BROACHING NEEDS
—Machines, Tools, and Engineering—

See American First—

MEMBER BROACHING TOOL INSTITUTE

★ American
BROACH AND MACHINE CO.

ANN ARBOR, MICHIGAN

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BROACHING MACHINES
PRESSES
BROACHING TOOLS
SPECIAL MACHINERY

DIVISION OF SUNDSTRAND MACHINE TOOL CO. ROCKFORD, ILLINOIS, U.S.A.

Illustration shows *American* Hydraulic T-4-24 Broaching Machine tooled for broaching cigarette holders and pipe radiator stems.

Two parts are loaded into fixture and the broaches lowered, by means of a special hydraulic retriever unit, thru the parts till the shank ends connect to the pull heads. The main hydraulic machine slide then pulls broaches thru parts—operator removes parts, slide is then reversed to bring broaches up to retriever unit which hydraulically raises to extreme up position ending one complete cycle.

As operator's only function is to insert and remove parts and operate machine levers, production is high—250 pieces per hour. Tolerance is held to .001.

NONFERROUS METALS

. . . News and Market Activities

Possible Tariff Action Holds Copper Unchanged

• • • **There is no change** in the recent price situation in copper in which major producers are adhering to the former price of 19.50¢ delivered Connecticut Valley while one custom smelter is selling its available tonnage at 1¢ per lb higher. Producers are reluctant to see any increase in the copper price at this time in view of the pending action for relief to consumers in the matter of the tariff. It is considered an inopportune time for the industry to jeopardize its position in tariff discussions. Producers point out that in normal prewar times it was customary for smelters' copper prices to vary from producers' prices because of the constant fluctuation of the scrap metal markets.

Now it appears that the copper stockpile may last for a longer period than the end of February as previously estimated. Some deliveries of RFC-bought foreign copper are expected to come into the country as late as April or May and in the form of blister copper which takes some time to pass through the refinery cycle. Therefore the immediate action on the copper tariff is not urgent at this time to prevent a forced increase in producers' prices.

It is reported that one custom smelter who would sell at the higher price has no copper to sell.

Customers who have been unable to obtain copper from producers are reported to be obtaining a large part of their requirements from government stocks. It is said that there have been limited imports of foreign copper by consumers who have paid the duty expecting to obtain a rebate when the fabricated products are exported within a period of 2 years.

Antimony

• • • **The National Lead Co.,** which recently bought out the principal domestic antimony producer, The Texas Mining & Smelting Co. of Laredo, Tex., has announced new quantity differentials on sales of antimony from its plant at Perth Amboy, N. J. These differentials are applied, in addition to the freight, to the bulk Laredo carload quotation:

Cents Per Pound	Bulk	Boxes
Up to 100 lb.	8	8½
100 to 299 lb.	5½	6
300 to 499 lb.	4½	5
500 to 999 lb.	3½	4
1000 to 1999 lb.	2½	3
2000 to 9999 lb	2	2½
10,000 lb to l. c. l.	1½	2

One producer has observed that these differentials would seem to penalize excessively the relatively small consumer of antimony.

Antimony production began in January at the Bunker Hill and Sullivan plant of the St. Joseph Lead Co., where its operation on a profitable basis is assured by the current high price of antimony.

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Move to Repeal Tariff

• • • **Representative James T. Patterson** (R., Conn.) has introduced into the House of Representatives a bill, HR 1626, designed to repeal the 4 pct tariff on imports of primary copper. The bill, introduced on Feb. 3, has been referred to the Ways and Means Committee. Mr. Patterson represents a portion of a state which is a large consumer of copper in brass and wire mills and whose constituents would be reluctant to see a significant price increase in copper due to the tariff on badly needed foreign supplies when protection for domestic producers would seem not to be necessary.

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Zinc

• • • **The zinc market** is in about the same position as in the past with consumers unable to fill their requirements from available production and demand particularly great for Prime Western. There are reports from the trade about scattered requests for deferment on shipments of Special High Grade. Some producers have had no evidence of this trend and in view of the fact that this grade of zinc for diecasting has been as badly in short supply as Prime Western, it is believed to represent merely a temporary situation caused by a maladjustment in diecasting production schedules. There is no change from the previous price structure. Exports of zinc continue largely on the basis that imports of concentrates are dependent on exports of slab zinc.

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Metals Short in Canada

Toronto

• • • **Lifting of** Canadian nonferrous metal prices has had comparatively little effect insofar as easing the supply situation. Consumers continue to report difficulty in obtaining sufficient copper and lead to meet requirements, but zinc supply has eased slightly in the past couple of weeks. Domestic demand is absorbing about 40 pct of Canadian production, and output of copper has been seriously affected by the strike at Noranda Mines, the largest producer in the Dominion. The greater part of Canada's exportable copper is under contract to Great Britain, leaving only small quantities for the United States markets.

Nonferrous scrap materials also are in short supply and the recent price advance has had only minor effect in bringing out fresh supplies.

Nonferrous Metals Prices

Cents per pound

	Feb. 5	Feb. 6	Feb. 7	Feb. 8	Feb. 10	Feb. 11
Copper, electro, Conn.	19.50—20.50	19.50—20.50	19.50—20.50	19.50—20.50	19.50—20.50	19.50—20.50
Copper, Lake, Conn.	19.625	19.625	19.625	19.625	19.625	19.625
Tin, Straits, New York	70.00	70.00	70.00	...	70.00	70.00
Zinc, East St. Louis	10.50	10.50	10.50	10.50	10.50	10.50
Lead, St. Louis	12.80	12.80	12.80	12.80	12.80	12.80

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point (min. 10,000 lb)	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American Laredo Tex.	28.25
Beryllium copper, 3.75-4.25% Be; dollars per lb contained Be	$14.75
Beryllium aluminum, 5% Be; dollars per lb contained Be	$27.50
Cadmium, del'd	$1.50
Cobalt, 97-99% (per lb)	$1.50 to $1.57
Copper, electro, Conn. Valley	19.50 to 20.50
Copper, lake, Conn. Valley	19.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$125.00
Lead, St. Louis	12.80
Lead, New York	13.00
Magnesium, 99.8 + %	20.50
Magnesium, sticks, carlots	36.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$88 to $90
Nickel, electro, f.o.b. New York	37.67
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$58 to $61
Silver, New York, cents per oz.	70.75
Tin, Straits, New York	70.00
Zinc, East St. Louis	10.50
Zinc, New York	11.005
Zirconium copper, 6 pct Zr, per lb contained Zr	$ 6.00

Remelted Metals

Brass Ingot

(Cents per lb, in carloads)

85-5-5-5 ingot	
No. 115	20.50
No. 120	20.00
No. 123	19.50
80-10-10 ingot	
No. 305	23.50
No. 315	22.00
88-10-2 ingot	
No. 210	25.75
No. 215	24.75
No. 245	21.75
Yellow ingot	
No. 405	16.25
Manganese Bronze	
No. 421	18.25

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys:	
0.30 copper, max.	18.25
0.60 copper, max.	18.00
Piston alloys (No. 122 type)	17.00
No. 12 alum. (No. 2 grade)	16.25—16.75
108 alloy	16.50—16.75
195 alloy	16.75—17.50
AXS-679	16.50—16.75
Steel deoxidizing aluminum, notch-bar, granulated or shot.	
Grade 1—95 pct-97½ pct	17.00
Grade 2—92 pct-95 pct	16.25
Grade 3—90 pct-92 pct	15.75
Grade 4—85 pct-90 pct	15.50

Electroplating Supplies

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	34⅞
Electrodeposited	28⅝
Rolled, oval, straight delivered	29½
Curved, 18 in. or longer, delivered	29⅛
Brass, 80-20, frt allowed	
Cast, oval, 15 in. or longer	31⅜
Zinc, Cast, 99.99	18¾
Nickel, 99 pct plus, frt allowed	
Cast	51
Rolled, depolarized	52
Silver, 999 fine	
Rolled, 1000 oz lots, per oz	75

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	34.00
Copper sulphate, 99.5, crystals, bbls	7.75
Nickel salts, single, 425 lb bbls, frt allowed	14.50
Silver cyanide, 100 oz lots, per oz	74.5
Sodium cyanide, 96 pct, domestic, 100 lb drums	15.00
Zinc cyanide, 100 lb drums	33.00
Zinc, sulphate, 89 pct, crystals, bbls, frt allowed	.0635

Mill Products

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall: 3S, 43.5¢; 52S-O, 67¢; 24S-T, 71¢; base, 30,000 lb.

Plate: ¼ in. and heavier: 2S, 3S, 21.2¢; 52S, 24.2¢; 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 30.5¢; base, 30,000 lb.

Flat Sheet: 0.136-in. thickness: 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 62S, 27¢ 75S, 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 37.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢; 1in., 2 in., 27¢; base, 5000 lb. *Rod:* 2S, 3S, 1¼ to 2½ in. diam, rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. *Round Wire:* drawn, coiled, B & S gage 17-18: 2S, 3S, 33.5¢; 56S, 39.5¢; 10,000 lb base; B & S gage 00-1: 2S, 3S, 21¢; 56S, 30.5¢. B & S 15-16: 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

Magnesium

(Cents per lb, f.o.b. mill)

Sheet and Plate: Ma, FSa, ¼ in.,54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 14, 69¢-74¢; 16, 79¢-81¢; 18, 87¢-89¢; 22, $1.25-$1.31; 24, $1.71-$1.75. Base quantity, 30,000 lb.

Round Rod: M, diam in. ⅛, 55¢; ¼, 47¢; ⅜, 46¢; ½, 45¢; ¾, 44¢; 1¾, 43.5¢; 2, 42.5¢; 3, 41.5¢; 4, 42.5¢ 5, 43.5¢; 6 & 7 in., 44¢. Base price, 5000-10,000 lb.

Square and Hexagonal Bar: M, diam in. ⅛, 58¢; ¼, 50¢; ⅜, 48¢; ½, 47.5¢; ¾, 46.5¢; 1¾, 45.5¢; 2, 44.5¢; 3, 43.5¢; 4 & 5 in. 44.5¢; 6 & 7 in., 45¢. Base quantity, 5000-10,000 lb.

Tubing: Varies with wall thickness and outside diameter.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	34	43
No. 35 sheets	..	41
Strip, cold-rolled	60	44
Rod		
Hot-rolled	50	39
Cold-drawn	55	44
Angles, hot-rolled	50	39
Plates	52	41
Seamless tubes	83	71
Shot and blocks	..	31

Zinc

(Cents per lb, f.o.b. mill)

Sheet, l.c.l.	15.50
Ribbon, ton lots	14.50
Plates	
Small	13.25
Large, over 12 in.	14.25
Lithographic, ungrained	17.25

Copper, Brass, Bronze

(Cents per lb)

	Extruded Shapes	Rods	Sheets
Copper	30.78	...	30.93
Copper, hot-rolled	....	27.28	....
Copper, drawn	....	28.28	...
Low brass, 80 pct	37.52	28.71	29.02
High brass	36.03	27.22	27.53
Red brass, 85 pct	38.03	29.22	29.53
Naval brass	27.50	26.25	32.19
Brass, free cutting	....	22.28	....
Commercial bronze	39.06	30.25	30.56
Manganese bronze	31.07	29.57	35.69
Phosphor bronze, 5 pct	....	49.07	48.82
Muntz metal	27.19	25.94	30.38
Everdur, Herculoy Olympic, etc.	34.45	34.73	35.79
Nickel silver, 5 pct	....	38.11	36.34
Architectural bronze	26.01	....	....

Scrap Metals

(Dealers' buying prices, f.o.b. New York in cents per pound.)

Brass Mill Scrap

(Lots of 15,000 lb or less)

Cartridge brass turnings	12⅞
Loose yellow brass trimmings	13¾

Copper and Brass

No. 1 heavy copper and wire	16 —16½
No. 2 heavy copper and wire	15 —15½
Light copper	13¼—13¾
Auto radiators (unsweated)	10¾—11¼
No. 1 composition	14 —14½
No. 1 composition turnings	13½—14
Clean red car boxes	10½—11
Cocks and faucets	12 —12¼
Mixed heavy yellow brass	8¾— 9
Old rolled brass	8¾— 9
Brass pipe	11½—11¾
New soft brass clippings	11½—11¾
Brass rod ends	11½—11¾
No. 1 brass rod turnings	11¼—11½

Aluminum

Alum. pistons with struts	4½— 5
Aluminum crankcases	8¼— 8½
2S aluminum clippings	8¼— 8½
Old sheet & utensils	7 — 7½
Mixed borings and turnings	2½— 3
Misc. cast aluminum	6¾— 7
Dural clips (24S)	5¾— 6

Zinc

New zinc clippings	7 — 7½
Old zinc	5¼— 5¾
Zinc routings	3 — 3⅛
Old die cast scrap	3 — 3¼

Nickel and Monel

Pure nickel clippings	22 —23
Clean nickel turnings	17 —18
Nickel anodes	19½—20½
Nickel rod ends	20 —21
New Monel clippings	14 —15
Clean Monel turnings	9 —10
Old sheet Monel	12 —12½
Old Monel castings	10 —11
Inconel clippings	10 —11
German silver clippings, mixed	10½—11
German silver turnings, mixed	7 — 7¼

Lead

Soft scrap lead	11 —11½
Battery plates (dry)	6¼— 6½

Miscellaneous

Block tin	60
No. 1 pewter	46 —48
No. 1 auto babbitt	36 —37
Mixed common babbitt	12 —12½
Solder joints	14 —14½
Siphon tops	38 —39
Small foundry type	15 —15½
Monotype	12½—13
Lino and stereotype	12 —12½
Electrotype	10 —10½
New type shell cuttings (nom.)	12 —12½
Clean hand picked type shells	5½— 6
Lino and stereo dross	6 — 6½
Electro dross	4 — 4½

Lead Products

(Cents per lb)

F.o.b. shipping point freight collect. Freight equalized with nearest free delivery point.

Full lead sheets	16.25
Cut lead sheets	16.75
Lead pipe, manufacturing point	15.50
Lead traps and bends	List +38%
Combination lead and iron bends and ferrules, also combination lead and iron ferrules	List +38%
Lead wool	17.50

SCRAP

Heavy Melting Scrap Again Advances

New York

• • • As the nation's scrap markets entered another week of rising prices it became clear to trade observers that only a relaxation of the desperate competition for scrap steel would return the market to an even keel. Tie-in sales and conversion arrangements are not new in the picture but there had been some hope expressed earlier this year that they would ease off.

On the contrary, scrap sources state, they are at least as widespread as ever and their cumulative effect is said to be one reason for snowballing scrap prices. Coupled with them are "remote" purchases which pull scrap from its normal consuming districts. This week, for instance, scrap was moving from Florida, past Birmingham and into northern consuming centers, and from Rochester to Pittsburgh.

As shown by the quotations on the facing page, openhearth grades advanced strongly in almost all major markets by $1 to $2.50 a ton, with no signs of any soft spots in the picture. Meanwhile, it is pointed out that today's quotations can not all arbitrarily reflect the extent and the prices of material coming into consuming districts from other areas since in most cases "delivered" prices actually refer only to material originating within the consuming district.

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PITTSBURGH—Despite the fact that the local scrap offering price was moved by the leading consumer from $32.50 to $35 a ton last week, there is little indication that any new tonnages can be placed at that figure. Actually, mills will have tough going to place any substantial orders at $35, some observers pointing out early this week that any new purchases would have to be for a price closer to $40. The $35 a ton price in Pittsburgh last week did nothing more than reflect the price increases rampant in other districts and did not reflect the supply-price picture right in the Pittsburgh district. Cast grades are in a little better supply only because of the fact that foundries have eased out of the market to some extent, since the gas shortage in the district that has been closing some foundries. Current quotations reflect that most recent sale on which brokers are already paying more than the sale price, as well as the most conservative evaluation of the substantial amount of scrap moving into this district from the outside.

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CHICAGO — Scrap prices moved up $2.50 last week on all heavy melting items. The raise was made chiefly to meet the competition of higher prices in the surrounding areas. It is the consensus that the higher price will not provide more scrap and that the increase was more of a protective measure than added inducement for better deliveries. The two mills in the area, which were converting rails into merchant bars for brokers who had paid the high prices to the railroads, have now discontinued this practice.

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PHILADELPHIA — Heavy melting prices advanced $1.50 above last week, carrying with them turnings to the extent of $1 and low phos bundles by 50c. Cast grades are up $2. Scrap movement is reported to have been retarded by recent cold weather, and the gondola car shortage is said to be growing more acute. Mills in this area are still in need of scrap but it is reported that some has moved out of the district to the west. Mills and foundries are in even greater need of pig iron. A Pennsylvania Railroad list offers approximately 7000 tons of scrap including less than 1000 tons of heavy melting.

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NEW YORK—In the face of strong demand, particularly from the Pittsburgh area, the lower half of the $29.50-$30 spread quoted here last week had disappeared by the end of the week. Early this week brokers were paying $30 for heavy melting steel, though some sales at $30.50 under certain limiting conditions were reported. Anyone who could offer a substantial tonnage could, it was said, command $30.50, making the price in the neighborhood of $39 delivered Pittsburgh.

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DETROIT—The scrap market boiled over here this week with some brokers offering as high as $30 per ton for openhearth grades, although there was no indication that large mill buyers in this territory had entered the market at the higher figure. However, Detroit mills were known to be paying $30 for upstate scrap. At the same time it is recognized that prices obtained for scrap moving in scrap-for-steel deals may be as much as $10 per ton below present quotations. Foundry grades continue to be spotty with special grades occasionally moving at price levels higher than those reported.

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CLEVELAND—Sales of No. 1 heavy melting at $35 to Valley consumers late last week have tended to stabilize to some extent a very unsettled local market. Purchases of remote scrap of "long distance" origin continue to be a very disturbing influence, although shipments are holding up on local scrap. Whether or not price is a factor in this is hard to say, but in any event there is not much scrap around for brokers or dealers to get caught with, in the event of a break in the market. The weather has been bad here, and in the Cleveland market the price of No. 1 will probably advance to $34.50 before the week is out. As for turnings in the Cleveland market, material originating here is being sold at $27; material being brought in from other districts is $28.50. Most of the local material is going out of town however at the higher prices.

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BOSTON—Heavy steel has reached a new high of $30 a ton, with the general market $29 to $30, mostly $29.50 to $30. Shop turnings are $21 to $22, the top price for Worcester delivery. Shoveling turnings are $23 to $24, mostly $24. Chemical borings in open cars are $23; in box cars $24. All foregoing prices represent an advance of $1 a ton. Cast prices have not budged. General market is not as excited as a week ago.

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BUFFALO—Scrap preparation was virtually halted at the start of the week by a Sunday blizzard which filled yards with drifted snow, and workers were busy digging out. Strength of steel making grades was undiminished, although prices were nominally unchanged. One of the leading mills was reported offering $32 for everything from No. 1 heavy melting to No. 2 bundles, but dealers were cautious about making commitments in view of the latest advances elsewhere. Pittsburgh is paying $30.50 a ton at Rochester for No. 2 heavy, equivalent to about $35 delivered.

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BIRMINGHAM—The market here is extremely chaotic. Prices on heavy melting steel have advanced $1.50 per ton and higher prices being offered for shipment to northern mills are disrupting prevailing quotations in this territory. As an indication of this, practically all Florida scrap with unusually high freight rates is moving to northern points. Normally it would go to southern consumers. As for supplies, peddlers are active and the amount of scrap coming into local yards is probably greater than at any time during the past 5 years.

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CINCINNATI—Consumers in this area state that the railroads are doing a great service not only to industry, but to the nation as a whole in holding down scrap prices here to about $32 a ton for large consumers. While large steel producers indicate that they are paying $32 for heavy, melting steel here they agree that remote sales elsewhere have nevertheless affected prices in this area.

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TORONTO—Receipts continue to lag as a result of severe winter conditions and only old shipments are reaching the city from outside points. There has been some improvement in offerings from industrial plants. Soaring U. S. scrap prices have had no direct bearing on controlled Canadian prices. While some steelmaking scrap is being imported from Great Britain and Europe, the United States has been shut off as a source of supply due to the wide price spread between the two countries. The scrap situation in Canada continues critical.

IRON AND STEEL SCRAP PRICES

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$35.00 to $36.00
RR. hvy. melting	35.00 to 36.00
No. 2 hvy. melting	35.00 to 36.00
RR. scrap rails	38.00 to 39.00
Rails 3 ft. and under	42.50 to 43.00
No. 1 comp'd bundles	35.00 to 36.00
Hand bdld. new shts.	35.00 to 36.00
Hvy. axle turn.	35.00 to 36.00
Hvy. steel forge turn.	35.00 to 36.00
Mach. shop turn.	28.50 to 29.00
Short shov. turn.	29.50 to 30.00
Mixed bor. and turn.	28.50 to 29.00
Cast iron borings	28.50 to 29.00
No. 1 cupola cast	42.00 to 43.00
Heavy breakable cast	36.00 to 37.00
Malleable	41.00 to 42.00
RR. knuck. and coup.	40.00 to 41.00
RR. coil springs	40.00 to 41.00
Rail leaf springs	40.00 to 41.00
Rolled steel wheels	40.00 to 41.00
Low phos.	38.50 to 39.00

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$32.00 to $32.50
No. 2 hvy. melting	32.00 to 32.50
No. 1 bundles	32.00 to 32.50
No. 2 dealers' bndls	32.00 to 32.50
Bundled mach. shop turn.	32.00 to 32.50
Galv. bundles	30.00 to 30.50
Mach. shop turn.	27.00 to 27.50
Short shovels, turn.	29.00 to 29.50
Cast iron borings	27.00 to 27.50
Mix. borings & turn.	24.50 to 25.00
Los. phos. hvy. forge	36.00 to 37.50
Low phos. plates	34.50 to 35.00
No. 1 RR. hvy. melt.	33.00 to 33.50
Reroll rails	44.75 to 45.50
Miscellaneous rails	39.00 to 40.00
Angles & splice bars	42.00 to 43.00
Locomotive tires, cut	40.00 to 43.00
Cut bolster & side frames	35.50 to 36.00
Standard stl. car axles	38.00 to 39.00
No. 3 steel wheels	38.25 to 38.75
Couplers & knuckles	38.00 to 38.50
Malleable	43.50 to 45.00
No. 1 mach. cast	43.50 to 45.00
Rails 2 ft. and under	43.00 to 45.00
No. 1 agricul. cast	38.00 to 38.50
Hvy. breakable cast	38.00 to 38.50
RR. grate bars	36.50 to 37.00
Cast iron brake shoes	38.25 to 38.75
Stove plate	36.00 to 38.50
Clean auto cast	37.00 to 40.00
Cast iron carwheels	37.00 to 38.00

CINCINNATI

Per gross ton delivered to consumer:

Cast grades f.o.b. shipping point

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	32.00
No. 1 bundles	32.00
No. 2 bundles	32.00
Mach. shop turn.	$23.50 to 24.00
Shoveling turn.	24.50 to 25.00
Cast iron borings	23.50 to 24.00
Mixed bor. & turn.	23.50 to 24.00
Low phos. plate	30.50 to 31.00
No. 1 cupola cast	33.00 to 35.00
Hvy. breakable cast	31.00 to 33.00
Stove plate	28.00
Scrap rails	26.00

BOSTON

Dealers' buying prices per gross ton. f.o.b. cars

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	29.00 to 30.00
Nos. 1 and 2 bundles	29.00 to 30.00
Busheling	29.00 to 30.00
Turnings, shovelings	22.50 to 24.00
Machine shop turn.	21.00 to 22.00
Mixed bor. & turn.	21.00 to 22.00
Cl'n cast. chem. bor.	23.00 to 24.00
No. 1 machinery cast	40.00 to 45.00
No. 2 machinery cast	40.00 to 45.00
Heavy breakable cast	40.00 to 45.00
Stove plate	40.00 to 45.00

DETROIT

Per gross, ton, brokers' buying prices, f.o.b. cars:

No. 1 hvy. melting	$28.25 to $28.75
No. 2 hvy. melting	28.25 to 28.75
No. 1 bundles	28.25 to 28.75
New busheling	28.25 to 28.75
Flashings	28.25 to 28.75
Mach. shop turn.	22.25 to 22.75
Short shov. turn.	23.25 to 23.75
Cast iron borings	$22.75 to $23.25
Mixed bor. & turn.	21.75 to 22.25
Low phos. plate	30.75 to 31.25
No. 1 cupola cast	41.25 to 44.25
Hvy. breakable cast	37.25 to 39.25
Stove plate	37.25 to 39.25
Automotive cast	nominal

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 bundles	33.00 to 34.00
No. 2 bundles	33.00 to 34.00
Mach. shop turn.	24.00 to 25.00
Shoveling turn.	27.00 to 28.00
Mixed bor. & turn.	24.00 to 25.00
Clean cast chemical bor.	31.00 to 32.00
No. 1 cupola cast	45.00 to 47.00
Hvy. breakable cast	44.00 to 45.00
Cast. charging box	44.00 to 45.00
Clean auto cast	45.00 to 47.00
Hvy. axle forge turn.	32.00 to 33.00
Low phos. plate	35.00 to 36.00
Low phos. punchings	35.00 to 36.00
Low phos. bundles	33.00 to 34.00
RR. steel wheels	36.50 to 37.50
RR. coil springs	36.50 to 37.50
RR. malleable	44.00 to 45.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$32.25 to $33.00
Bundled sheets	32.25 to 33.00
Mach. shop turn.	27.25 to 28.00
Locomotive tires, uncut	34.50 to 35.00
Misc. std. sec. rails	37.00 to 38.00
Rerolling rails	40.00 to 41.00
Steel angle bars	35.00 to 37.00
Rails 3 ft. and under	40.00 to 41.00
RR. springs	36.50 to 37.00
Steel car axles	35.00 to 37.00
Stove plate	30.00 to 32.00
Grate bars	30.00 to 32.00
Brake shoes	30.00 to 32.00
Malleable	40.00 to 42.00
Cast iron carwheels	36.00 to 37.00
No. 1 machinery cast	37.00 to 38.00
Breakable cast	35.00 to 36.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$29.00 to $29.50
No. 2 hvy. melting	29.00 to 29.50
No. 2 bundles	29.00 to 29.50
No. 1 busheling	29.00 to 29.50
Long turnings	21.00 to 21.50
Shoveling turnings	23.00 to 23.50
Cast iron borings	21.00 to 21.50
Bar crops and plate	32.00 to 33.00
Structural and plate	32.00 to 33.00
No. 1 cast	37.50 to 38.00
Stove plate	30.00 to 31.00
Steel axles	30.00 to 31.00
Scrap rails	29.00 to 30.00
Rerolling rails	33.00 to 33.50
Angles & splice bars	32.00 to 33.00
Rails 3 ft & under	32.00 to 33.00
Cast iron carwheels	30.00 to 31.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$34.50 to $35.00
No. 2 hvy. melting	34.50 to 35.00
Low phos. plate	37.00 to 37.50
No. 1 busheling	37.00 to 37.50
Hydraulic bundles	37.00 to 37.50
Mach. shop turn.	28.50 to 29.50
Short. Shovel, turn.	28.50 to 29.50
Cast iron borings	28.50 to 29.50
Elec. furnace punch	34.00 to 34.50

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$30.00
No. 2 hvy. melting	30.00
Comp. black bundles	30.00
Comp. galv. bundles	$27.50 to 28.00
Mach. shop turn.	22.50 to 23.00
Mixed bor. & turn.	22.50 to 23.00
Shoveling turn.	24.50 to 25.00
No. 1 cupola cast	39.00 to 40.00
Hvy. breakable cast	39.00 to 40.00
Charging box cast	$39.00 to $40.00
Stove plate	39.00 to 40.00
Clean auto cast.	39.00 to 40.00
Unstrip. motor blks.	36.00 to 38.00
Cl'n chem. cast bor.	24.00 to 25.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$31.50 to $32.00
No. 1 bundles	30.00 to 31.00
No. 2 bundles	28.50 to 29.00
No. 2 hvy. melting	30.00 to 31.00
Mach. shop turn.	20.75 to 21.75
Shoveling turn.	22.25 to 23.25
Cast iron borings	21.75 to 22.75
Mixed bor. & turn.	20.75 to 21.75
No. 1 cupola cast	35.00 to 40.00
Charging box cast	29.00 to 30.00
Stove plate	30.00 to 35.00
Clean auto cast	35.00 to 40.00
Malleable	33.00 to 33.50
Low. phos. plate	32.00 to 34.00
Scrap rails	29.75 to 30.25
Rails 3 ft. & under	33.75 to 34.25
RR. steel wheels	33.75 to 34.25
Cast iron carwheels	32.00 to 32.50
RR. coil & leaf spgs.	33.75 to 34.25
RR. knuckles & coup.	33.75 to 34.25
No. 1 busheling	30.00 to 31.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	32.00 to 33.00
Compressed sheet stl.	32.00 to 33.00
Drop forge flashings	32.00 to 33.00
No. 2 bundles	32.00 to 33.00
Mach. shop turn.	27.00 to 28.50
Short shovel	27.00 to 28.50
No. 1 busheling	32.00 to 33.00
Steel axle turn.	32.00 to 33.00
Cast iron borings	26.50 to 27.50
Mixed bor. & turn.	26.50 to 27.50
No. 1 machinery cast	37.50 to 40.00
Malleable	42.50 to 45.00
Railroad cast	40.00 to 42.50
Railroad grate bars	35.00 to 37.00
Stove plate	37.50 to 38.00
RR. hvy. melting	32.00 to 33.00
Rails 3 ft. & under	41.50 to 42.00
Rails 18 in. & under	42.50 to 43.00
Rails for rerolling	37.00
Elec. furnace punch	36.50 to 37.00

SAN FRANCISCO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50
No. 2 hvy. melting	19.50
No. 2 bales	19.50
No. 3 bales	16.00
Mach. shop turn.	13.00
Elec. furn. 1 ft. und.	19.50
No. 1 cupola cast	32.00
RR. hvy. melting	20.50

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50
No. 2 hvy. melting	19.50
No. 1 bales	19.50
No. 2 bales	19.50
No. 3 bales	16.00
Mach. shop turn.	13.00
No. 1 cupola cast	25.00
RR. hvy. melting	20.50

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melting	$19.00
Elec. furn. 1 ft. und.	22.50
No. 1 cupola cast	29.00
RR. hvy. melting	20.00

HAMILTON, ONT.

Per gross ton delivered to consumer:

Cast grades f.o.b. shipping point

Heavy melting	$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scrap	15.50*
Rails, remelting	18.50*
Rails, rerolling	21.50*
Bushelings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast	19.00*
Stove plate	17.50*
Car wheels, cast	19.50*
Malleable iron	16.00*

* Ceiling price

Comparison of Prices . .

Advances over past week in Heavy Type, declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel: (cents per pound)	Feb. 11, 1947	Feb. 4, 1947	Jan. 7, 1947	Feb. 12, 1946
Hot-rolled sheets	2.50	2.50	2.50	2.20
Cold-rolled sheets	3.20	3.20	3.20	3.05
Galvanized sheets (10 ga.)	3.55	3.55	3.55	3.70
Hot-rolled strip	2.50	2.50	2.50	2.10
Cold-rolled strip	3.20	3.20	3.20	2.80
Plates	2.65	2.65	2.65	2.25
Plates, wrought iron	5.95	5.95	5.95	3.80
Stain's c-r strip (No. 302)	30.30	30.30	30.30	28.00
Tin and Terneplate: (dollars per base box)				
Tinplate, standard cokes.	$5.75	$5.75	$5.75	$5.00
Tinplate, electro (0.50 lb)	5.05	5.05	5.05	4.50
Special coated mfg. ternes	4.90	4.90	4.90	4.30
Bars and Shapes: (cents per pound)				
Merchant bars	2.60	2.60	2.60	2.25
Cold-finished bars	3.20	3.20	3.20	2.75
Alloy bars	3.05	3.05	3.05	2.70
Structural shapes	2.50	2.50	2.50	2.10
Stainless bars (No. 302).	25.97	25.97	25.97	24.00
Wrought iron bars	6.15	6.15	6.15	4.40
Wire and Wire Products: (cents per pound)				
Bright wire	3.30	3.30	3.30	2.75
Wire nails	3.75	3.75	3.75	2.90
Rails: (dollars per 100 lb)				
Heavy rails	$2.50	$2.50	$2.50	$43.00*
Light rails	2.35	2.35	2.35	45.00*
*per gross ton				
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$42.00	$42.00	$42.00	$36.00
Sheet bars	50.00	50.00	38.00	36.00
Slabs, rerolling	42.00	42.00	42.00	36.00
Forging billets	50.00	50.00	50.00	42.00
Alloy blooms, billets, slabs	61.00	61.00	61.00	54.00
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.55	2.55	2.55	2.15
Skelp	2.35	2.35	2.05	1.90

Pig Iron: (per gross ton)	Feb. 11, 1947	Feb. 4, 1947	Jan. 7, 1947	Feb. 12, 1946
No. 2, foundry, Phila.	$32.51	$32.51	$32.43	$27.59
No. 2, Valley furnace	30.50	30.50	30.50	25.75
No. 2, Southern, Cin'ti	31.75	31.75	29.80	26.19
No. 2, Birmingham	26.88	26.88	26.88	22.13
No. 2, foundry, Chicago†	30.50	30.50	30.50	25.75
Basic, del'd eastern Pa.	33.67	33.67	31.93	27.09
Basic, Valley furnace	30.00	30.00	30.00	25.25
Malleable, Chicago†	30.50	30.50	30.50	25.75
Malleable, Valley	30.50	30.50	30.50	25.75
Charcoal, Chicago	42.99	42.99	42.99	42.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡ For carlots at seaboard.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$35.50	$33.25	$32.25	$20.00
Heavy melt'g steel, Phila.	33.50	32.00	31.00	18.75
Heavy melt'g steel, Ch'go	32.25	29.75	29.75	18.75
No. 1, hy. comp. sheet, Det.	28.50	27.00	27.00	17.32
Low phos. plate, Youngs'n	37.25	34.25	34.25	22.50
No. 1, cast, Pittsburgh	42.50	40.50	40.38	20.00
No. 1, cast, Philadelphia.	46.00	44.50	41.50	20.00
No. 1, cast, Chicago	44.25	44.25	42.50	20.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$8.75	$8.75	$8.75	$7.50
Foundry coke, prompt	8.50	8.50	8.50	9.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	19.75	19.75	19.50	12.00
Copper, Lake, Conn.	19.625	19.625	19.625	12.00
Tin, Straits, New York	70.00	70.00	70.00	52.00
Zinc, East St. Louis	10.50	10.50	10.50	8.25
Lead, St. Louis	12.80	12.80	12.35	6.35
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	37.67	37.67	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	28.25	28.25	28.25	14.50

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

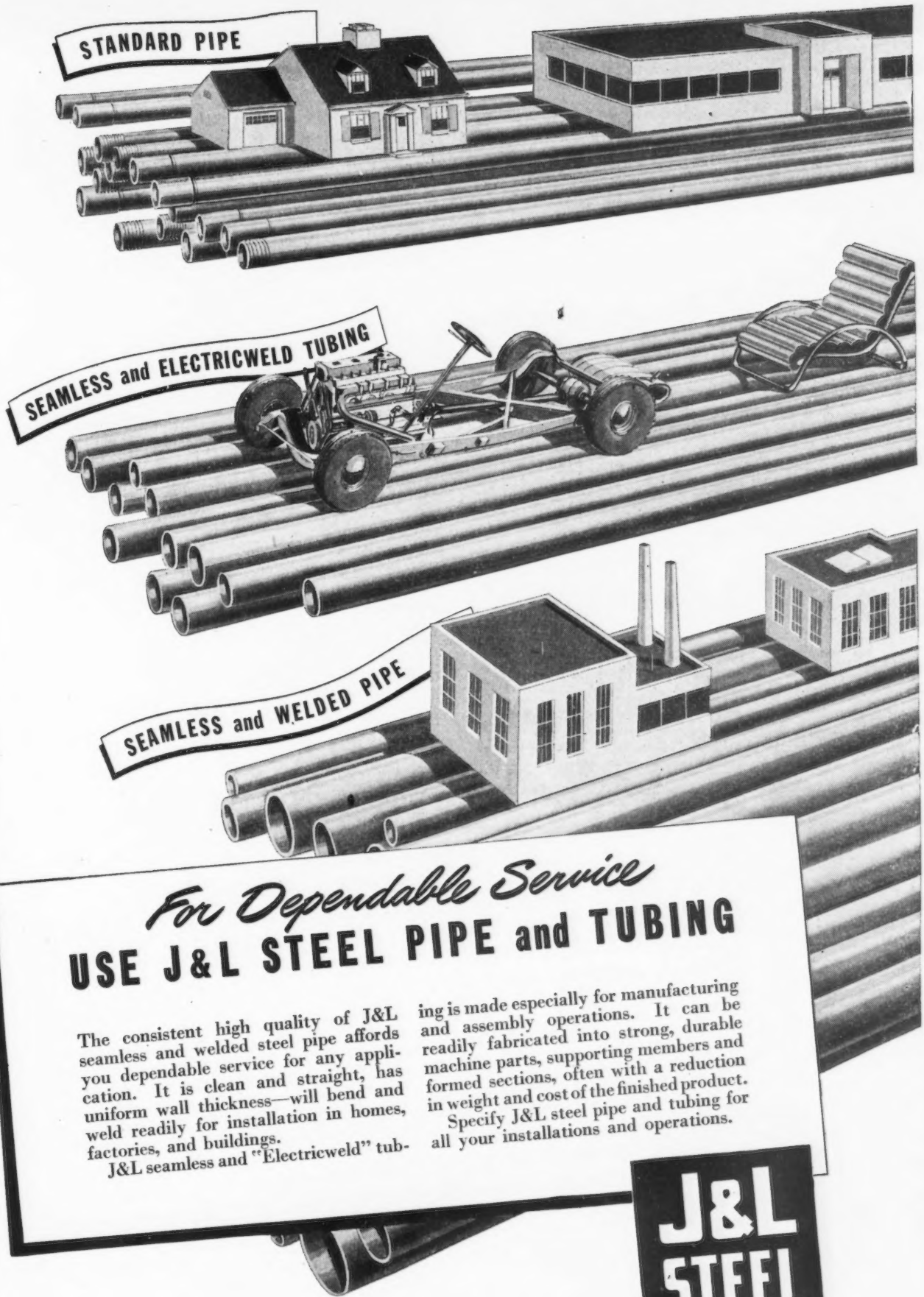
	FINISHED STEEL	PIG IRON	SCRAP STEEL
Feb. 11, 1947	2.87255¢ per lb.	$30.15 per gross ton.	$33.75 per gross ton.
One week ago	2.87255¢ per lb.	$30.15 per gross ton.	$31.67 per gross ton.
One month ago	2.87255¢ per lb.	$30.14 per gross ton.	$31.00 per gross ton.
One year ago	2.54490¢ per lb.	$25.37 per gross ton.	$19.17 per gross ton.

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1947	2.87255¢	2.87255¢	$30.15 Jan. 28	$30.14 Jan. 7	$33.75 Feb. 11	$31.00 Jan. 7
1946	2.83599¢ Dec. 31	2.54490¢ Jan. 1	$30.14 Dec. 10	$25.37 Jan. 1	$31.17 Dec. 24	$19.17 Jan. 1
1945	2.44104¢ Oct. 2	2.38444¢ Jan. 2	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.29176¢	2.29176¢	23.61	23.61	$19.17	$19.17
1942	2.28249¢	2.28249¢	23.61	23.61	19.17	19.17
1941	2.43078¢	2.43078¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 28	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2,32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 3

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia, and Chicago.



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USE J&L STEEL PIPE and TUBING

The consistent high quality of J&L seamless and welded steel pipe affords you dependable service for any application. It is clean and straight, has uniform wall thickness—will bend and weld readily for installation in homes, factories, and buildings.

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J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PA.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. Industry practice has discontinued arbitrary f.o.b. prices at Gulf and Pacific Ports. Space limitations prevent quotation of delivered prices at major ports. (1) Commercial quality sheet grade; primes, 25c above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25c per 100 lb to fabricators. (8) Also shafting. For quantities of 20,000 lb to 39,999 lb. (9) Carload lot in manufacturing trade. (10) This base price for annealed, bright finish wires, commercial spring wire. (11) Boxed. (12) Produced to dimensional tolerances in AISI Manual Sec. 6. (13) Delivered San Francisco only. (14) Delivered.

Basing Points	Pitts-burgh	Chicago	Gary	Cleve-land	Birm-ingham	Buffalo	Youngs-town	Spar-rows Point	Granite City	Middle-town, Ohio		San Fran.co, Los Angeles, Seattle	DELIVERED TO Detroit	New York	Phila-delphia
INGOTS															
Carbon, rerolling	($35.00 f. o. b. mill)														
Carbon, forging	$40.00	$40.00	$40.00	$40.00	$40.00	$40.00	$40.00								
Alloy	$52.00	$52.00				$52.00	(Bethlehem, Massillon, Canton, Coatesville—$52.00)								
BILLETS, BLOOMS, SLABS															
Carbon, rerolling	$42.00	$42.00	$42.00	$42.00	$42.00	(Provo—$53.20) $42.00	$42.00	$42.00					$45.00		
Carbon, forging billets	$50.00	$50.00	$50.00	$50.00	$50.00	(Provo—$61.20, Duluth—$52.00[13]) $50.00	$50.00						$53.00		
Alloy	$61.00	$61.00				$61.00	(Bethlehem, Massillon, Canton—$61.00)						$64.00		
SHEET BARS							$50								
PIPE SKELP	2.35¢	2.35¢					2.35¢	2.35¢	(Coatesville—2.35¢)						
WIRE RODS	2.55¢	2.55¢		2.55¢	2.55¢	(Worcester—2.65¢)						3.27¢[13]			
SHEETS															
Hot-rolled	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.875¢	2.50¢			2.65¢	2.79¢	2.70¢
Cold-rolled [1]	3.20¢	3.20¢	3.20¢	3.20¢		3.20¢	3.20¢		3.30¢				3.35¢	3.61¢	3.58¢
Galvanized (10 gage)	3.55¢	3.55¢	3.55¢		3.55¢		3.55¢	3.55¢	3.65¢					3.84¢	3.75¢
Enameling (12 gage)	3.55¢	3.55¢	3.55¢	3.55¢			3.55¢		3.65¢				3.70¢	3.95¢	3.93¢
Long ternes [2] (10 gage)	3.55¢	3.55¢	3.55¢											3.95¢	3.91¢
STRIP															
Hot-rolled [3]	2.50¢	2.50¢	2.50¢		2.50¢		2.50¢						2.65¢	2.93¢	2.88¢
Cold-rolled [4]	3.20¢	3.30¢		3.20¢			3.20¢			(Worcester—3.40¢)			3.35¢	3.61¢	3.58¢
Cooperage stock	2.80¢	2.80¢			2.80¢		2.80¢							4.09¢	
TINPLATE															
Standard cokes, base box	$5.75	$5.75	$5.75		$5.85			$5.85	$5.85		(Warren, Ohio—$5.75)		$6.157	$6.062[11]	
Electro, box {0.25 lb / 0.50 lb / 0.75 lb}	Deduct 90¢ from standard coke base box price. Deduct 70¢ from standard coke base box price. Deduct 50¢ from standard coke base box price.														
BLACKPLATE 29 gage [5]	3.60¢	3.60¢	3.60¢		3.70¢			3.70¢	3.70¢		(Warren, Ohio—$5.75)			3.99¢	3.90¢
TERNES, MFG. Special coated, base box	Deduct 85¢ from standard coke base box price.														
BARS															
Carbon steel	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢					3.285¢	2.75¢	3.01¢	2.98¢
Rail steel [6]	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢									
Reinforcing (billet) [7]	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢				2.985¢	2.60¢	2.74¢	2.65¢
Reinforcing (rail) [7]	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢						2.75¢		
Cold-finished [8]	3.20¢	3.20¢	3.20¢	3.20¢		3.20¢	(Detroit—3.25¢)							3.61¢	3.58¢
Alloy, hot-rolled	3.05¢	3.05¢				3.05¢	3.05¢	(Bethlehem, Massillon, Canton—3.05¢)					3.20¢		3.19¢
Alloy, cold-drawn	3.80¢	3.80¢	3.80¢	3.80¢		3.80¢							3.90¢		
PLATE															
Carbon steel [12]	2.65¢	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢	(Coatesville, Claymont—2.80¢, Geneva Utah—2.80¢) 2.65¢				[3.46¢][14]	2.905¢	2.87¢	2.85¢
Floor plates	3.90¢	3.90¢											4.24¢	4.30¢	4.28¢
Alloy	3.79¢	3.79¢			(Coatesville—4.10¢)									4.01¢	3.895¢
SHAPES Structural	2.50¢	2.50¢	2.50¢		2.50¢	2.50¢	(Geneva, Utah—2.65¢) (Bethlehem—2.50¢)					3.41¢[14]	2.81¢	2.70¢	2.64¢
SPRING STEEL, C-R															
0.26 to 0.50 carbon	3.55¢			3.55¢			(Worcester—3.75¢)								
0.51 to 0.75 carbon	4.80¢			4.80¢			(Worcester—5.00¢)								
0.76 to 1.00 carbon	6.65¢			6.65¢			(Worcester—6.85¢)								
1.01 to 1.25 carbon	8.85¢			8.85¢			(Worcester—9.05¢)								
MANUFACTURERS' WIRE [9]															
Bright [10]	3.30¢	3.30¢		3.30¢	3.30¢		(Worcester—3.40¢, Duluth—3.35¢)					5.63¢[13]		3.71¢	3.68¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire Base														
Spring (high carbon)	4.25¢	4.25¢		4.25¢		(Worcester—4.35¢, Duluth—4.50¢)				(Trenton—4.50¢)		5.24¢[13]		4.66¢	4.345¢
PILING Steel sheet	3.00¢	3.00¢				3.00¢								3.41¢	3.36¢

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

Basing Point	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.	22.99	24.67	17.01	17.47	20.69	25.29
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	22.99	24.67	17.01	17.47	20.69	25.29
Billets, P'gh, Chi, Canton, Watervliet, Syracuse, Balt.	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Water, Syracuse, Ft. Wayne, Titusville	23.00	22.50	17.50	17.50	21.00	25.50
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville	27.50	26.00	20.50	21.00	24.50	30.00
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet	27.50	26.00	20.50	21.00	24.50	30.00
Plates, P'gh, Middletown, Canton	31.50	29.50	23.50	24.00	28.00	33.00
Shapes, structural, P'gh, Chi	27.50	26.00	20.50	21.00	24.50	30.00
Sheets, P'gh, Chi, Middletown, Canton, Balt.	39.00	37.00	29.00	31.50	35.50	39.50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	25.50	23.50	18.50	19.00	26.00	38.00
Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown	32.50	30.50	24.00	24.50	35.00	56.50
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila.	27.50	26.00	20.50	21.00	24.50	30.00
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton	32.46	30.30	23.80	24.34	34.62	56.26
Rod, h-r, Syracuse	27.05	25.97	20.02	20.56	24.34	29.75
Tubing, seamless, P'gh, Chi, Canton, (4 to 6 in.)	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, O.)*

An increase of 8.2 pct applies to base price and extras

	Base per lb
High speed	67¢
Straight molybdenum	54¢
Tungsten-molybdenum	57½¢
High-carbon-chromium*	43¢
Oil hardening*	24¢
Special carbon*	22¢
Extra carbon*	18¢
Regular carbon*	14¢

Warehouse prices on and east of Mississippi are 2¢ per lb higher; west of Mississippi 3¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	per lb
Field grade	4.20¢
Armature	4.50¢
Electrical	5.00¢
Motor	5.70¢
Dynamo	6.45¢
Transformer 72	6.95¢
Transformer 65	7.65¢
Transformer 58	8.35¢
Transformer 52	9.15¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., per 100 lb	$2.50
Angle splice bars, 100 lb	3.00
(F.o.b. basing points)	*per 100 lb*
Light rails (from billets)	$2.85
Light rails (from rail steel), f.o.b. Williamsport, Pa.	2.95

	Base per lb
Cut spikes	4.50¢
Screw spikes	6.40¢
Tie plate, steel	2.80¢
Tie plates, Pacific Coast	2.95¢
Track bolts	6.50¢
Track bolts, heat treated, to railroads	6.75¢
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, add 25¢.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	$6.75	$13.50

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless-clad		
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Coatesville, Pa.	24.00*	22.00
Nickel-clad		
10 pct, f.o.b. Coatesville, Pa.	21.50	....
Inconel-clad		
10 pct, f.o.b. Coatesville	30.00	....
Monel-clad		
10 pct, f.o.b. Coatesville	29.00	....
Aluminized steel		
Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

*Includes annealing and pickling.

MERCHANT WIRE PRODUCTS

To the dealer f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Base per keg	Delivered San Francisco
Standard, galvanized and coated nails	$3.75†	$4.83
Cut nails, carloads	5.30	....

†10¢ additional at Cleveland

	Base per 100 lb	
Annealed fence wire	$3.95	$4.96
Annealed galv. fence wire	4.40	5.41

	Not based at Cleveland Base column	
Woven wire fence*	84	107
Fence posts, carloads	82††	...
Single loop bale ties	86	110
Galvanized barbed wire**	94	114
Twisted barbless wire	94	...

*15½ gage and heavier. **On 80-rod spools in carload quantities. ††Pittsburgh; Duluth 90.

HIGH STRENGTH, LOW ALLOY STEELS

base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	HI Steel	Mayari R	Otiscoloy	Yoloy	Y-50	NAX
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	American Rolling Mill	Great Lakes Steel
Plates	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	....	4.10
Sheets										
Hot-rolled	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	....	3.75
Cold-rolled	4.75	4.75	4.75	....	4.75	4.75	4.75	4.75	5.225*	4.55
Galvanized	....	5.40	....	....	....	5.40	....	....	....	....
Strip										
Hot-rolled	3.85	3.85	3.85	....	3.85	3.85	3.85	3.85	....	3.75
Cold-rolled	....	....	4.75	....	....	4.75	4.75	4.75	5.00*	4.55†
Shapes	....	3.85	....	....	3.85	3.85	3.85	3.85	....	....
Beams	....	3.85	....	....	....	3.85	....	....	....	....
Bars										
Hot-rolled	4.00	4.00	4.00	....	....	4.00	4.00	4.00	....	4.00
Cold-rolled	....	....	....	....	....	....	....	4.60	....	....
Bar shapes	....	4.00	....	....	4.00	4.00	4.00	4.00	....	....

* 21 gage and lighter. † Pittsburgh, add 0.10¢ at Chicago and Gary.

PIPE AND TUBING

Base discounts. F.ob. Pittsburgh and Lorain, steel buttweld and seamless. Others f.o.b. Pittsburgh only

Base price, $200.00 per net ton

Standard, threaded & coupled

Steel, buttweld	Black	Galv.
½-in.	55½	41
¾-in.	58½	45
1 to 3-in.	60½	47½
Wrought Iron, buttweld		
½-in.	2	+20
¾-in.	11½	+10
1 and 1¼-in.	17	+ 2
1½-in.	22½	1½
2-in.	23	2
Steel, lapweld		
2-in.	53	39½
2½ and 3-in.	56	42½
3½ to 6-in.	58	44½
Steel, seamless		
2-in.	52	38½
2½ and 3-in.	55	41½
3½ to 6-in.	57	43½
Wrought Iron, lapweld		
2-in.	14½	+ 5½
2½ to 3½-in.	17	+ 1½
4-in.	21	4
4½ to 8-in.	19	2½

Extra Strong, plain ends

Steel, buttweld		
½-in.	54½	41½
¾-in.	58½	45½
1 to 3-in.	60	48
Wrought Iron, buttweld		
½-in.	6½	+14
¾-in.	12½	+ 8
1 to 2-in.	22	2
Steel, lapweld		
2-in.	52	39½
2½ and 3-in.	56	43½
3½ to 6-in.	59½	47
Steel, seamless		
2-in.	51	38½
2½ and 3-in.	55	42½
3½ to 6-in.	58½	46
Wrought Iron, lapweld		
2-in.	17½	+ 2
2½ to 4-in.	26	8½
4½ to 6-in.	22	4

Basing discounts for standard pipe are for threads and couplings. For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. F.o.b. Gary prices are one point lower discount on all buttweld. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft, f.o.b. Pittsburgh in carload lots, cut length 4 to 24 ft, inclusive.

O.D. in.	Gage BWG	Seamless Hot-Rolled	Seamless Cold-Drawn	Electric Weld Hot-Rolled	Electric Weld Cold-Drawn
2	13	$15.29	$18.17	$15.00	$17.95
2½	12	20.57	24.43	20.11	24.07
3	12	22.87	27.18	22.26	26.68
3½	11	28.86	34.30	28.06	33.64
4	10	35.82	42.55	34.78	41.68

CAST IRON WATER PIPE

	Per net ton
6-in. to 24-in., del'd Chicago	$75.56
6-in. to 24-in. del'd New York	73.80
6-in. to 24-in., Birmingham	65.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles for all rail shipment; rail and water shipment less	89.00

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Base discount less case lots

	Percent Off List
½ in. & smaller x 6 in. & shorter	55
9/16 & ⅝ in. x 6 in. & shorter	52
¾ in. x 6 in. & shorter	49
1⅛ in. and larger, all lengths	48
Lag, all diam over 6 in. long	48
Lag, all diam x 6 in. & shorter	50
Plow bolts	57

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	48
9/16 to 1 in. inclusive	47
1⅛ to 1½ in. inclusive	45
1⅝ in. and larger	44

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	U.S.S.	S.A.E.
Base discount less case lots		
7/16 in. and smaller	..	51
½ in. and smaller	48	..
½ in. through 1 in.	..	48
9/16 in. through 1 in.	47	..
1⅛ in. through 1½ in.	45	46
1⅝ in. and larger	44	..

In full case lots, 15 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

	Consumer
Packages, nuts separate	60 and 10
In bulk	74

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets

(½ in. and larger)

	Base per 100 Lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$5.25
F.o.b. Lebanon, Pa.	5.40

Small Rivets

(7/16 in. and smaller)

	Percent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	55 and 5

Cap and Set Screws (In packages)	*Percent Off List Consumer*
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	56
Set screws, cup and oval points	61
Milled studs	33
Flat head cap screws, listed sizes	21
Fillister head cap, listed sizes	40

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Effective CaF_2 Content:	*Base price per short ton*
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer	$5.95
Old range, non-bessemer	5.80
Mesabi, bessemer	5.70
Mesabi, non-bessemer	5.55
High phosphorus	5.55

Prices quoted retroactive to Jan. 1, 1947.

METAL POWDERS

Prices in cents per pound in ton lots, f.o.b. shipping point.

Brass, minus 100 mesh	23¢ to 27¢
Copper, electrolytic, 100 and 325 mesh	30¢ to 31½¢
Copper, reduced, 150 and 200 mesh	29¢ to 30½¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe	11¢ to 16¢
Swedish sponge iron, 100 mesh, c.l.f. N. Y., carlots, ocean bags	7.4¢ to 8¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots	5¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots	66¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe	25¢ to 31¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	17¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90¢ to $1.75
Aluminum, 100, 200 mesh, carlots	23¢ to 26¢
Antimony, 100 mesh	36.05¢
Cadmium, 100 mesh	$2.00
Chromium, 100 mesh and finer	$1.025
Lead, 100, 200 & 300 mesh	18.50¢ to 23.50¢
Manganese, minus 325 mesh and coarser	33¢
Nickel, 150 mesh	51½¢
Silicon, 100 mesh	18.15¢
Solder powder, 100 mesh	8½¢ plus metal
Tin, 100 mesh	76.75¢
Tungsten metal powder, 98%-99%, any quantity, per lb	$2.60
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb	$2.65
Under 100 lb	$2.90

COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$8.75
Connellsville, Pa., hand drawn	9.35
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	8.50
Foundry, Byproduct	
Chicago, del'd	15.10
Chicago, f.o.b.	14.35
New England, del'd	16.04
Kearny, N. J., f.o.b.	14.40
Philadelphia, del'd	14.62
Buffalo, del'd	14.75
Portsmouth, Ohio, f.o.b.	12.85
Painesville, Ohio, f.o.b.	13.50
Erie, del'd	14.50
Cleveland, del'd	14.55
Cincinnati, del'd	14.60
St. Louis, del'd	15.10†
Birmingham, del'd	12.25

†Except producers situated in states other than Missouri, Alabama or Tennessee, sellers may charge a maximum delivered price of $15.60 in the St. Louis Mo., and East St. Louis, Ill., switching districts.

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Carloads Per 1000
Sec. quality, Ohio	57.00
First quality, Pa., Md., Ky., Mo., Ill., Ohio	65.00
First quality, New Jersey	70.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	59.00
Sec. quality, New Jersey	62.00
Sec. quality, Ohio	57.00
Ground fire clay, net ton, bulk	9.50

Silica Brick

Pennsylvania and Birmingham	$65.00
Chicago District	74.00
Silica cement, net ton (Eastern)	11.50
Chicago	12.50

Chrome Brick	*Per Net Ton*
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$54.00

Magnesite Brick

Standard, Balt. and Chester	$76.00
Chemically bonded, Baltimore	65.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks	$44.50
Domestic, f.o.b. Chewelah, Wash., in bulk	22.00
in sacks	26.00
Clinker (dead burned) dolomite, bulk, per net ton, f.o.b. York, Pa.	10.05
Midwest, add 10¢; Mo. Valley, add 20¢	

WAREHOUSE PRICES

Base prices, delivered metropolitan areas, per 100 lb.

CITIES	SHEETS			STRIP		Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot-Rolled (10 gage)	Cold-Rolled (10 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled			Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
**Philadelphia	$4.24	$5.33	$5.29[e]	$4.43	....	$4.40	$4.22	$4.48	$5.38	$8.37	$8.37	$9.88	$9.88
New York	4.42	5.72[1]	5.47	4.62	5.25	4.72	4.37	4.62	5.42	8.42	8.42	9.92	9.92
Boston	....	6.218	....	....	5.156	....	....	....	5.468	....	....	....	....
Baltimore	4.09	....	5.14	....	....	4.39	4.34	4.45	5.35	....	....	....	....
Norfolk	4.35	....	....	....	....	4.50	4.50	4.75	5.50	....	....	....	....
Chicago	4.00	....	....	4.00	....	4.30	4.05	4.05	4.95	8.10	8.10	....	9.35
Milwaukee	4.199	5.349	5.249	4.199	....	4.499	4.249	4.249	5.149	8.399	8.399	9.649	9.649
Cleveland	....	....	....	....	....	....	....	....	4.95	8.358	8.358	9.35	9.35
Buffalo	4.00	5.15	5.35	4.302	6.002	4.65	4.05	4.05	4.95	8.10	8.10	9.35	9.35
Detroit	4.14	5.29	5.42	4.34	....	4.59	4.42	4.19	5.00	....	....	....	....
Cincinnati	4.116	4.716	5.166	....	....	4.803	....	....	5.252	....	....	....	....
St. Louis	4.199	5.349	5.424	4.199	....	4.499	4.249	4.249	5.324	8.574	8.574	9.824	9.824
Pittsburgh	3.725	4.60[1]	....	4.00	....	3.95	3.80	4.05	4.95	8.10	8.10	9.35	9.35
St. Paul	3.384[7]	5.534[1]	5.434[2]	4.404[7]	....	4.684[7]	4.434[7]	4.434[7]	5.726[6]	....	10.084[6]	....	11.726[6]
Duluth	....	....	....	....	....	....	....	....	....	....	....	....	....
Omaha	4.868	6.618[1]	5.918	4.862	....	5.168	4.918	4.918	5.818	....	....	....	....
Indianapolis	....	....	....	....	....	....	....	....	....	....	....	....	....
Birmingham	3.85	....	5.20	4.10	....	4.30	4.05	4.05	5.83	....	....	....	....
Memphis	....	....	....	....	....	....	....	....	....	....	....	....	....
New Orleans	*4.46[11]	5.77[1]	....	....	....	4.83[11]	*4.68[11]	*4.78[11]	6.14	....	....	....	....
Los Angeles	....	....	....	....	....	....	....	....	....	....	....	....	....
San Francisco	4.90[8]	6.30[9]	6.45	5.20[8]	....	5.00[8]	4.90[8]	4.70[8]	7.00[10]	....	....	....	....
Seattle	5.00	7.80	6.05	....	....	5.25	4.95	4.90	6.75	....	....	....	....
Portland	5.00[3]	....	6.25	....	....	5.40	5.10	5.10	....	....	....	....	....
Salt Lake City	5.85	....	7.10	....	....	5.55	5.85	5.95	7.00	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars 1000 lb and over.

ALLOY BARS: 1000 and over.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 10,000 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999; (8) 400 lb and over; (9) 450 to 1499; (10) 500 to 999; (11) 400 to 3999.

([e]) Philadelphia: Galvanized sheet, 25 or more bundles.

* Add 46¢ for sizes not rolled in Birmingham.

** City of Philadelphia area only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area after deducting 34¢ per 100 lb (L.c.l. Sparrows Point to Philadelphia).

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums.

BASING POINT PRICES					
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	31.00	31.50	32.00	32.50	.....
Birdsboro	34.00	34.50	35.00	35.50	39.00
Birmingham	26.38	26.88	.....	.....	.....
Buffalo	30.00	30.50	31.00	31.50	.....
Chicago	30.00	30.50	30.50	31.00	.....
Cleveland	30.00	30.50	30.50	31.00	.....
Detroit	30.00	30.50	30.50	31.00	.....
Duluth	30.50	31.00	31.00	31.50	.....
Erie	30.00	30.50	31.00	31.50	.....
Everett	29.00	29.50	30.00	30.50	.....
Granite City	30.00	30.50	30.50	31.00	.....
Neville Island	30.00	30.50	30.50	31.00	.....
Provo	30.00	30.50	.....	.....	.....
Sharpsville	30.00	30.50	30.50	31.00	.....
Steelton	31.00	31.50	32.00	32.50	36.00
Swedeland	31.00	31.50	32.00	32.50	.....
Toledo	30.00	30.50	30.50	31.00	.....
Youngstown[1]	30.00	30.50	30.50	31.00	.....

DELIVERED PRICES† (BASE GRADES)							
Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.50 Arb.	29.50	30.00	30.50	31.00	.....
Boston	Birdsboro-Steelton	4.82	.....	.....	.....	.....	40.82*
Brooklyn	Bethlehem	3.00	34.00	34.50	35.00	35.50	.....
Brooklyn	Birdsboro	3.50	.....	.....	.....	.....	43.50
Canton	Clev., Ygstn., Sharpsville	1.67	31.67	32.17	32.17	32.67	.....
Cincinnati	Birmingham	4.87	31.25	31.75	.....	.....	.....
Jersey City	Bethlehem	1.84	32.84	33.34	33.84	34.34	.....
Jersey City	Birdsboro	2.33	.....	.....	.....	.....	41.33
Los Angeles	Provo	5.94	35.94	36.44	.....	.....	.....
Mansfield	Cleveland-Toledo	2.33	32.33	32.83	32.83	33.33	.....
Philadelphia	Swedeland	1.01	32.01	32.51	33.01	33.51	.....
Philadelphia	Birdsboro	1.49	.....	.....	.....	.....	40.49
San Francisco	Provo	5.94	35.94	36.44	.....	.....	.....
Seattle	Provo	5.94	35.94	36.44	.....	.....	.....
St. Louis	Granite City	0.75 Arb.	30.75	31.25	31.25	31.75	.....

* To $43.82.

(1) Struthers Iron & Steel Co., Struthers, Ohio, charges 50¢ per ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base price for low phosphorous $37.50 per gross ton, f.o.b. Lyles, Tenn. Delivered to Chicago, $42.99. High phosphorous charcoal pig iron is not being produced.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$38.00; f.o.b. Buffalo—$39.25. Add $1.00 per ton for each additional 0.50 pct Si, up to 12 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Less ton lots (packed)	148.50
F.o.b. Pittsburgh	139.50

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Briquets—cents per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk	6.40	6.65	7.20
Ton lots	7.30	7.90	9.80
Less ton lots	7.70	8.30	10.20

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$39.00	$40.00
F.o.b. Pittsburgh		44.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	30
L.c.l. lots	32

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.10% max. C, 0.06% P, 90% Mn	21.00	21.40	21.65
0.10% max. C	20.50	20.90	21.15
0.15% max. C	20.00	20.40	20.65
0.30% max. C	19.50	19.90	20.15
0.50% max. C	19.00	19.40	19.65
0.75% max. C, 7.00% max. Si	16.00	16.40	16.65

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.45
Ton lots	7.40
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet	6.15
Ton lots	7.05
Less ton lots	7.45

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, $56.00 f.o.b. Keokuk, Iowa; $52.75 f.o.b. Jackson, Ohio; $54.00 f.o.b. Niagara Falls. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots packed.

	Eastern	Central	Western
96% Si, 2% Fe	14.65	16.90	18.65
97% Si, 1% Fe	15.05	17.30	19.05

Ferrosilicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si. 1 lb briquets.

	Eastern	Central	Western
Carload, bulk	3.85	4.10	4.30
Ton lots	4.75	5.35	5.65
Less ton lots	5.15	5.75	6.05

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
25% Si	11.65	...	...
50% Si	7.45	7.95	8.15
75% Si	9.25	9.55	10.30
80-90% Si	10.45	10.75	11.50
90-95% Si	12.05	12.35	13.05

Ferrochrome (65-72% Cr, 2% max. Si)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	23.00	23.40	24.00
0.10% C	22.50	22.90	23.50
0.15% C	22.00	22.40	23.00
0.20% C	21.50	21.90	22.50
0.50% C	21.00	21.40	22.00
1.00% C	20.50	20.90	21.50
2.00% C	19.50	19.90	20.50
65-69% Cr, 4-9% C	15.60	16.00	16.15
62-66% Cr, 4-6% C, 6-9% Si	16.60	17.00	17.15

Briquets — contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk	9.85	10.10	10.20
Ton lots	10.75	11.65	12.25
Less ton lots	11.15	12.05	12.65

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	16.70	17.10	17.25
Ton lots	17.90	19.20	20.00
Less ton lots	18.60	19.90	20.70

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern	Central	Western
Carload	20.00	20.40	21.00
Ton lots	21.00	21.65	22.85
Less ton lots	22.00	22.65	23.85

Chromium Metal

Contract prices, cents per lb, chromium contained, carload, f.o.b. shipping point, freight allowed. 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C	83.50	85.00	86.25
0.50% max. C	79.50	81.00	82.25
9.00% min. C	79.50	81.00	82.25

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	13.00	13.50	15.55
Ton lots	14.50	15.25	17.40
Less ton lots	15.50	16.25	18.40

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	15.50	16.00	18.05
Ton lots	16.50	17.35	19.10
Less ton lots	17.00	17.85	19.60

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1.5¢ for central zone; 3.5¢ for western zone.

	Cast	Turnings	Distilled
Ton lots	$1.60	$2.35	$2.95
Less ton lots	1.95	2.70	3.75

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

	Eastern	Central	Western
Ton lots	13.50	14.60	16.55
Less ton lots	14.25	15.35	17.30

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	13.25	14.35	16.30
Less ton lots	14.00	15.10	17.05

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe.

	Eastern	Central	Western
Ton lots	13.25	14.35	16.30
Less ton lots	14.00	15.10	17.05

Other Ferroalloys

Ferrotungsten, standard, lump or ¼X down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained T, 5 ton lots, freight allowed	$1.88
Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.	
Openhearth	$2.70
Crucible	$2.80
High speed steel (Primos)	$2.90
Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, per pound contained V_2O_5	$1.10
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb.	
Ton lots	$2.50
Less ton lots	$2.55
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	95¢
Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	80¢
Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo	80¢
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo	80¢
Ferrotitanium, 40-45%, 0.10%C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti	$1.23
Less ton lots	$1.25
Ferrotitanium, 20-25%, 0.10%C max., ton lots, per pound contained Ti	$1.35
Less ton lots	$1.40
High carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton	$142.50
Ferrophosphorus, 18%, electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equalled with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, Electrolytic, 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton	$75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	14.50¢
Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy	
Carload, bulk	4.85¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Niagara Falls, carload	6.25¢
Ton lots	6.75¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Car lots	8.50¢
Ton lots	9.25¢
Less ton lots	9.75¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed. Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
Less ton lots	$1.30	$1.3075	$1.329

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.055

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots	$2.10	$2.1125	$2.1445

Silcaz, contract basis, f.o.b. plant freight allowed, per pound of alloy.

Carload lots	35¢
Ton lots	37¢

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.

No. 1	87.5¢
No. 6	60¢
No. 79	45¢

Bortram, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Reports 24 Pct Dollar Increase in Die, Tool Sales

Cleveland

• • • **A 24 pct increase** in the dollar value of dies, tools, molds and other special tooling shipped in the last two months of 1946, nearly one-fourth above that of the same period in 1945, has been reported by the National Tool & Die Manufacturers Assn.

The 24 pct rise in shipments indicates a good increase in volume since reports from all over the country show that the general price levels on tool and die work fall short of reflecting increases in costs and have changed but little since VJ-Day, the association pointed out.

"This means that manufacturers of metal and plastic articles are banking on tooling up more intensively to cut their labor costs," George S. Eaton, executive secretary of the tool and die organization, pointed out. "It also means that the approach of keener competition is causing some of them to go ahead with preparations to bring out really new postwar models, in spite of all the labor and material uncertainties that plague the country."

Reflecting the usual year-end quietness, orders received in December, as reported to the association, showed a 15 pct decline from the November level. December shipments, however, were the highest of any month in the fourth quarter.

Because of the trend toward more elaborate tooling as a means of lowering production costs, Mr. Eaton anticipates a gradual rise in tool shop operations. He added that the volume of special tooling is an excellent barometer of future business, as tooling orders must precede by some months the time when a factory can begin to turn out any new model. If a serious recession is in prospect, the output of dies and tools cannot be expected to continue its recent increase, he said.

At the 2-day quarterly meeting of the directors of the National Tool & Die Manufacturers Assn., Jan. 24 and 25 at the Statler Hotel, Cleveland, much attention was paid to possible means of giving employers equality with unions in collective bargaining, with emphasis on the necessity of paying special attention to the small businessman's needs in any legislation adopted, if his situation is to be much improved.

Rise in Shipments Reflects Substantial Increase In Volume of Business

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The following special committee was appointed to handle labor legislative matters for the NTDMA: W. R. White, Jr., Chicago (chairman); B. C. Buerk, Buffalo; R. E. Ehrhardt, Dayton; C. W. Holmberg, New York; L. R. Lance, Jr., Philadelphia; R. F. Moore, Bridgeport, and R. F. Mueller, St. Louis.

George S. Eaton

Announcement was made that the association's "Principles of Business Conduct," had been distributed to 2500 contract tool and die shops throughout the country. This code was developed over a 2-year period by its committee on business conduct, and was approved at its convention in Chicago last October.

Commenting on the code, Willis G. Ehrhardt, Ehrhardt Tool & Machine Co., St. Louis, who is president of the association, said, "The tool and die manufacturer's ingenuity and experience often finds a way to cut costs sharply through improvements in the special tooling. Such service is essentially professional in nature, and the business dealings between the tool and die shop owner and his customers should be on the highest plane. It is the purpose of this code to encourage fair play in these relationships."

Directors reached a decision to hold the association's 1947 annual meeting on Nov. 2-5 at the Benjamin Franklin Hotel, Philadelphia.

British Chemical Lab Reviews Corrosion Data

London

• • • **The chemical** research laboratory of the British Dept. of Scientific and Industrial Research has recently published a review of existing information on the use of bituminous materials for the protection of iron and steel against corrosion. It is reported that more than $160 million are spent every year in Britain to protect iron and steel from rust, and that the world's losses due to rust amount to $2000 millon a year.

The purpose of the report is to stimulate interest and experiment in the use of coal tar and bitumen for the protection of iron and steel against corrosion. While coal tars have been kept in mind, information has been sought on the properties of allied materials which might prove useful in corrosion prevention. Special mention of immersed conditions and anti-fouling compositions for use on ships' hulls is included, and it is understood that many investigators have reported good service from tar paints in protecting metals under immersed conditions.

Bundy Workers Profiting by Participating Cost Savings Plan

Detroit

• • • **Employees of Bundy Tubing Co.** participating in Bundy Cost Savings Plan have received an increase of $335 per employee working full time during the first 9 months operations of the plant, Ernest A. Gratton, controller and assistant treasurer, told the Society for the Advancement of Management in Detroit recently.

Average hourly premium payment per employee for the period is 22¢ per hr, Mr. Gratton said.

The Bundy Cost Savings Sharing Plan (THE IRON AGE, Oct. 31, 1946, p. 92) deducts wages actually paid during a given period to produce a "standard sales dollar" from a wage allowance based on labor costs for a previous base period and divides the labor savings so computed equally between hourly wage earners and management. Payments due employees are computed monthly and payments are made every 3 months, Mr. Gratton said. Estimated labor savings since adoption of the plan is $400,000, according to Bundy officials.

Notes Decline in Absenteeism, Grievances and Increase In Plant Efficiency

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Since the plan was adopted, Bundy estimates that plant efficiency has increased 35 pct; time required to handle plant grievances has decreased a like amount and absenteeism has fallen off 37 pct, Mr. Gratton said. Bundy officials estimate that scrap losses, partly attributable to the plan, have dropped 13½ pct and labor turnover has been reduced.

In response to specific questions concerning the detailed workings of the plan, Mr. Gratton said that no overtime or shift premiums are included in the wage computations and that neither nonrecurring expense items or price increases are included in the Bundy wage formula. The prices Bundy uses in its present computation, Mr. Gratton said, are OPA or 1941 prices. It is not now foreseen, he said, that future changes in the selling price of the company's products will upset the present formula, although revisions may be required from time to time.

Under the present plan, material costs likewise do not affect the bonus calculations.

Any opposition on the part of either employees or the union that may have existed when the plan was adopted seems to have practically vanished, Mr. Gratton declared.

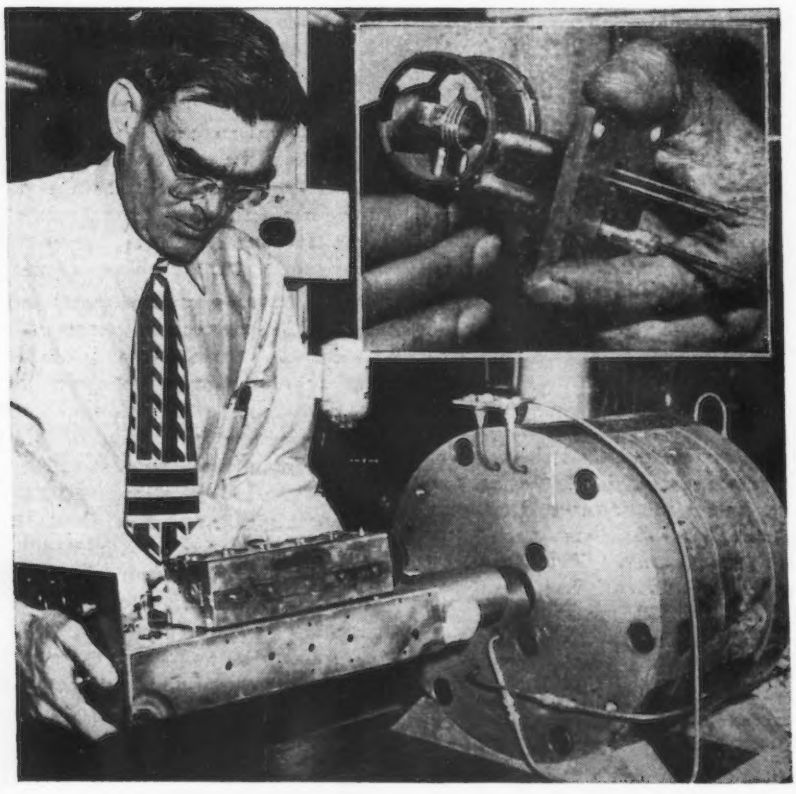
Of particular interest to SAM members present was the fact that Bundy does not require the establishment of production standards based on time studies. Time study men continue to be used, however, in estimating jobs, Mr. Gratton explained.

Under the terms of the agreement between the company and the UAW-CIO, public accountants are called in once a year to review the calculation of the bonus payments. "These accountants," Mr. Gratton said, "examine the company records used in calculating the bonus but do not have access to all company records. Our books are not open to the union," he explained.

Mr. Gratton said that all salaried employees, including office workers and executives, participate in a Profit Sharing Plan which the company operates in addition to the Cost Savings Sharing Plan.

About 200 persons attended the SAM meeting which was held at the Rackham Bldg. James H. Barrett, secretary-treasurer of the Murray Corp. of America, presided.

NUCLEAR SPINNER: *William W. Hansen, one of the co-inventors of a nuclear induction machine at Stamford University, Palo Alto, Calif., looks over the latest model of a device designed to provide further information about atoms. Inset shows the heart of the device. At a certain frequency characteristic to each element, current applied to the outer coil causes particles in the nucleus of the element under test to spin, inducing a corresponding high frequency current in the smaller coil. The machine may also prove a quick practical method for chemical analysis.*



Government of India Building Laboratory For Metallurgy Study

Delhi, India

• • • **Now under construction at** Jamshedpur, center of modern metallurgy in India, is a new laboratory which observers here hailed as a further step toward realization of the Government's program of encouraging research in India. Known as the National Metallurgical Laboratory, it is one of a number which the Government plans to build throughout the country.

The laboratory when completed will cover all aspects of metallurgical research, both fundamental and applied and will also carry out research on ores, minerals and refractories as applied to metallurgy. The preparation of minerals and ores and the smelting of the latter are so definitely a part of the development of the country's metallurgical industries that the facilities for mineral research have been provided at the laboratory, complete with pilot plant equipment for semi-commercial development.

As the metallurgical industry is a large consumer of refractories, research on this subject has also been associated with that on metallurgy, and work on metallurgical furnace design may also be undertaken. Work on refractories will be greatly facilitated by the presence of the ore-dressing and mineral research section with its specialized laboratory and pilot plant assemblies.

Provision has been made in the final plans of the National Metallurgical Laboratory for chemical analysis, physical chemistry, physics as it affects metallurgical problems, and the examination, preparation and smelting of metallic ores. Also the melting, heat treatment and working of metals and alloys, research into the structure and physical properties of metals and alloys, the electro-deposition and surface treatment of metals, and research on refractories.

Facilities will also be provided for the application of research results to commercial operating conditions and for the study of such conditions as they affect the quality of the products and the efficiency and economy of commercial production.

The laboratory will consist of a main building containing administrative offices, research laboratories, museum, lecture theatre, library and a separate technological block comprising large workshop type laboratories with associated control rooms for practical semi-commercial scale operations. Planning of the laboratory was initiated by a committee headed by Sir J. J. Ghandy, director, Tata Industries, Ltd.

Canadian Steel Production and Shipments

Toronto

• • • **Canadian production and producers' shipments of primary iron and steel shapes showed a sharp gain in October over the two months immediately preceding when output was seriously curtailed due to strikes. During October 146,979 net tons of carbon steel were made and shipments totalled 164,099 tons, while 7214 tons of alloy steel were produced with shipments totalling 8481 tons, which compares with September production of 67,069 tons of carbon steel and shipments of 68,251 tons and 4272 tons of alloy steel made and 3819 tons shipped. The average output of carbon steel for the first six months of this year was 235,483 net tons per month and shipments averaged 237,240 net tons a month while output of alloy steel averaged 6469 tons and shipments 6305 tons a month.**

For the first ten months of 1946 primary carbon, iron and steel shapes produced in Canada totalled 1,826,061 net tons while shipments for the period amounted to 1,838,867 tons; output of alloy steel shapes in the ten month period totalled 59,434 net tons and shipments 57,771 tons.

The following table presents production and shipments of primary iron and steel shapes for October in net tons:

October, 1946	Carbon Steel		Alloy Steel	
	Made	Shipped	Made	Shipped
Billets, etc., for forging	4,015	4,987	396	435
Other semi-finished shapes not for re-rolling	7,260	5,189	161	123
Structural shapes and piling	9,823	9,255	.....	.....
Plates	11,546	22,110	.....	.....
Rails	1,775	5,964	.....	.....
Tie plates and track material				
Splice bars	.....	824	.....	.....
Tie plates	2,634	2,076	.....	.....
Spikes	700	579	.....	.....
Tool steel	248	149	405	299
Hot rolled bars for forging	4,841	4,921	1,285	3,078
Concrete reinforcing bars	5,925	5,813	.....	.....
Hot rolled bars for cold finishing	172	160	.....	.....
Other hot rolled bars	24,652	26,073	3,173	2,898
Pipes and tubes	12,766	10,458	.....	.....
Wire rods	13,017	16,252	17	20
Hot rolled black sheets	7,744	7,178	.....	.....
Cold reduced black sheets	2,253	2,253	.....	.....
Galvanized sheets	2,046	1,681	.....	.....
Steel castings—by ingot makers	932	1,077	39	37
by other foundries	3,705	3,788	1,574	1,434
All other shapes including tin plate, tin mill, black plate, cold finished bars and strips, etc.	30,925	33,312	164	159
TOTAL	146,979	164,099	7,214	8,481

Producers' shipments of primary iron and steel shapes, sub-divided according to principal consuming industries for the October quarter in net tons follow:

Industry	Carbon Steel	Alloy Steel
Automotive industries	3,995	4,016
Agricultural, including farm machinery	6,068	50
Building construction	23,255	97
Containers industry	16,305	5
Machinery and tools	11,713	783
Merchant trade products	19,147	147
Mining, lumbering, etc.	4,763	1,221
National defense	136	1
Pressing, forming and stamping	7,127	128
Public works and utilities	1,392	56
Railway operating	8,232	229
Railway cars and locomotives	6,767	17
Shipbuilding	3,631	33
Miscellaneous and unclassified	752	42
Wholesalers and warehouses	19,373	396
Producers' interchange	25,374	110
Direct export—to British Empire	195	91
to other countries	5,874	1,059
TOTAL	164,099	8,481

(*Continued from page 66*)

Polymerin 100: Corrosion-resistance durable finish and combined with film hardness, lustre, adhesion, toughness and color retention; for use where low temperature high-speed baking characteristics are important. Ault & Wiborg, Dana & Thomas Aves., Cincinnati.

Poly-pale: Polymerized rosin for rosin varnishes and other protective coatings. Hercules Powder Co., Inc., Wilmington, Del.

Polyplastic: Synthetic baking finish for metal products; white and colors. Standard Varnish Works, 2600 Richmond Terrace, Staten Island, N. Y.

Polystyrene: Styral resin used in place of wax for patterns in the precision casting of ferrous metals. Bakelite Corp., 30 E. 42nd St., New York 17; Dow Chemical Co., 917 Jefferson Ave., Midland, Mich.; Monsanto Chemical Co., 1702 S. Second St., St. Louis 4; Catalin Corp., 3 Park Ave., New York 16; Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17; American Phenalic Corp., 1852 S. 54th St., Chicago 14.

Pomet 111: 5 to 10 Sn, 95 to 90 pct low-porosity bronze powder for making mechanical and electrical parts. Powder Metallurgy, Inc., Greenpoint & Review Aves., Long Island City, N. Y.

Pomet 300 & 309: High-purity iron powders for magnet cores, pole pieces, etc., and for mechanical and electrical parts. Powder Metallurgy, Inc., Greenpoint & Review Aves., Long Island City, N. Y.

Pomet 389: Low-porosity steel-like material pressed from powders; for mechanical and electrical parts. Powder Metallurgy Corp., Review & Greenpoint Ave., Long Island City, N. Y.

Pomet 560: Aluminum alloy equivalent to cast aluminum; for mechanical and electrical parts. Powder Metallurgy Corp., Review & Greenpoint Ave., Long Island City, N. Y.

Pomoloy: Alloy iron for deep well pumps. Pomona Pump Co., Pomona, Cal.

Porcelanite: Chemical in powder form for brushing or spraying onto furnace interiors as a protection against corrosive action of gases, flue dust and slag. O. Hommel Co., 209 4th Ave., Pittsburgh 30.

Porcelfrit: Ground coat and cover coat vitreous porcelain enamel frits for use as a protective covering on sheet steel and cast iron. Ingram-Richardson Mfg. Co. of Ind., Inc., 1600 Jefferson Rd., Frankfort, Ind.

Porce-Tite: White waterproof paint, used in a consistency from that of a cement-like compound for filling cracks and crevices to that of a free flowing paint. Bedard & Morency Mill Co., Oak Park, Ill.

Porciflex: Baking enamel, providing a flexible porcelain-like finish which has a high resistance to acids, alkalies, oils and greases. H. V. Walker Co., Elizabeth, N. J.

Porex: Controlled-porosity filtering material, pressed from 92 Cu, 8 Sn metal powders. For filtering, diffusing or metering fluids, gases, air, etc., in process industries automotive equipment, powder units, etc. Moraine Products Div. General Motors Corp., Dayton, Ohio.

Poro Bronze: 80 Sn, 13 Sb, 7 Cu alloy for bearings. Poro Metals Ltd., London, England.

Poro-Carbon: Carbon filter tubes for the clarification of liquids. R. P. Adams Co., Inc., 55 Chicago St., Buffalo.

Poroclean: For preparing metal surfaces for plating. Turco Products, Inc., Los Angeles 54.

Poro-Screen: Monel cloth filter tubes for the clarification of corrosive liquids. R. P. Adams Co., Inc., 55 Chicago St., Buffalo.

Poro-Stone: Aluminum-oxide filters for the clarification of liquids. R. P. Adams Co., Inc., 55 Chicago St., Buffalo.

Portage: Horizontal boring, drilling and milling machines. Portage Machine Co., 1021 Sweitzer Ave., Akron 11, Ohio.

• In order to assure the accuracy and completeness of this directory, manufacturers and suppliers serving the metalworking industry are requested to check the trade names appearing in this and succeeding issues and to advise THE IRON AGE of any omissions or errors. These changes will be incorporated in the first reprint made for general distribution. Communications should be addressed to THE IRON AGE, 100 E. 42nd St., New York 17. Attention Trade Name Directory.

Porter: Lathes. Porter-McLeod Machine Tool Co., Hatfield, Mass.

Porto Shear: Portable electric hand shear for rapid cutting of sheet metal in straight or patterned lines. Black & Decker Mfg. Co., Towson 4, Md.

Porous-Krome: Pure, hard chromium applied to cylinder bores and other bearing surfaces. Van Der Horst Corp. of America, Olean, N. Y.

Poro-Screen: Automatic filters to provide clean water for industrial operations. R. P. Adams Co., Inc., 73 Chicago St., Buffalo.

Potentiotrols: Electronic, indicating potentiometer controllers for the measurement and control of temperatures between the ranges of 0 and 3600°F. Wheelco Instruments Co., Chicago 7.

Powdiron: Porous iron-base bearing material, with or without copper and other alloys, containing controlled amounts of impregnated lubricants. Bound Brook Oil-less Bearings Co., Bound Brook, N. J.

Power: Bronze for heavy-load bearings. Magnolia Metal Co., Elizabeth, N. J.

Power-Flex: Underfeed Stokers. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Powermak: Hydraulic device designed for use on industrial machinery and vehicles and in aircraft. Electrol, Inc., 86 Grand St., Kingston, N. Y.

Powersteel: Wire rope. Broderick & Bascom Rope Co., 4203 N. Union Blvd., St. Louis 15.

Powrarm: Hydraulic universal positioner for welding, servicing, assembling, etc. Garfield Engineering Corp., Troost Ave. at Bannister Rd., Kansas City 5.

Prairie: Corn cribs and wire fences. American Steel & Wire Co., Cleveland 13.

Pratt: Box car loaders. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Pre-Cast Bearing Bronze: Thin-wall laminated type of bearing consisting of SAE 64 bronze bonded to steel; available as finished bearings, washers, strips, or in rolls up to 400 ft in length. Johnson Bronze Co., New Castle, Pa.

Precipitron: Electrostatic air cleaners. Westinghouse Electric Corp., East Pittsburgh, Pa.

Precision: Light-gage cold-rolled stainless and carbon-steel strip. Gold Metal Products Co., Youngstown.

Precision: Collet and lathe attachments. General Die & Stamping Co., 262 Mott St., N.Y.

Precision: Series of cast aluminum alloys with high impact strength for light-alloy diecastings. Precision Castings Co., Syracuse, N. Y.

Precision: Space screens used for grading material. Wickwire Spencer Steel Div., 500 Fifth Ave., New York 18.

Precision Casting: Equipment and supplies for lost wax investment molding process. Alexander Saunders & Co., 95 Bedford St., N.Y.

Precision Casting: Technical consultants and equipment makers. Kerr Dental Mfg. Co., 6081 Twelfth St., Detroit 8.

Precision Greases: Special greases for antifriction bearings operating at a wide range of speeds and temperatures. Gulf Oil Corp., Gulf Bldg., Pittsburgh.

Precision - Jarrett: Metallurgical specimen mounting equipment. Precision Scientific Co., 1738-1754 N. Springfield Ave., Chicago 47.

Precision Welders: Resistance welding machines including spot, projection, seam, flash, butt and portable types. Precision Welder & Machine Co., 138 E. McMicken Ave., Cincinnati 10.

Precisionaire: Air gage utilizing the metering of air-flow principle for use in external and internal measuring. Sheffield Corp., Box 893, Dayton 1.

Precisionplate: Gages and parts which have been chromed by special chrome process. Sheffield Corp., Box 893, Dayton 1.

Pregwood: Wood impregnates with phenolic resin; strong and easy to fabricate. Formica Insulation Co., 4621 Spring Grove Ave., Cincinnati.

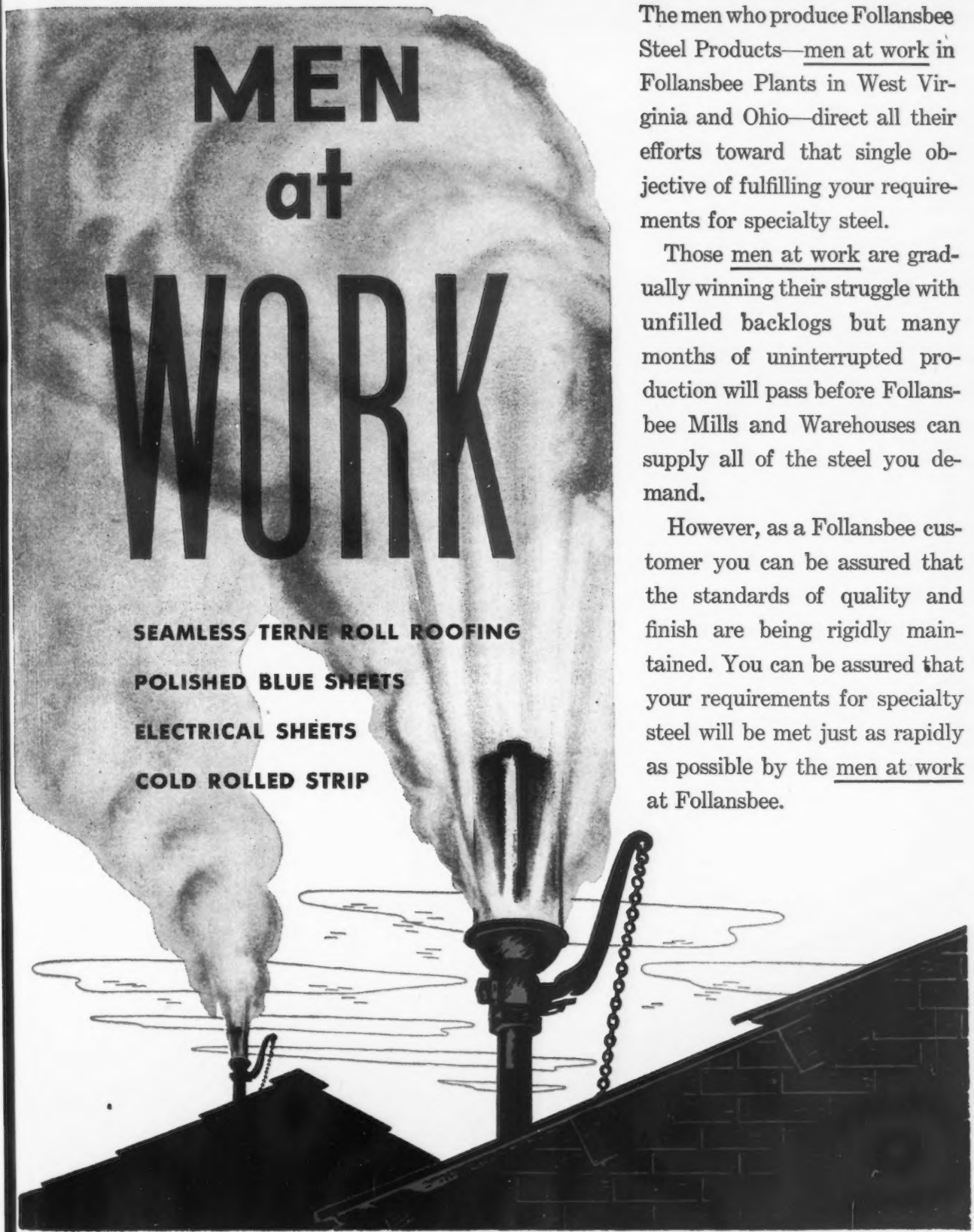
Premag: Copper with 0.8 Al for welding rods. Murex Ltd., Rainham, England.

Premier: Light-colored, general purpose cutting oils of the active sulfur type. Standard Oil Co. (Indiana), 910 S. Michigan Ave., Chicago 80.

Premier Nickel Chrome: Nickel alloys with 25 Fe, 11-15 Cr, Mn; for rheostats, dipping baskets, wire cloth. Alloy Metal Wire Co., Moore, Pa.

Premier: Welding wire and spring wire. American Steel & Wire Co., Cleveland 13.

Prep-Rite: For phosphatizing ferrous metal surfaces to improve corrosion resistance underneath paint finishes. Neilson Chemical Co., 6564 Benson St., Detroit 7.



The men who produce Follansbee Steel Products—men at work in Follansbee Plants in West Virginia and Ohio—direct all their efforts toward that single objective of fulfilling your requirements for specialty steel.

Those men at work are gradually winning their struggle with unfilled backlogs but many months of uninterrupted production will pass before Follansbee Mills and Warehouses can supply all of the steel you demand.

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POLISHED BLUE SHEETS • SEAMLESS TERNE ROLL ROOFING

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Prep-Pik-L: For removing heavy rust and light scale; no corrosive action on surrounding plant equipment. Neilson Chemical Co., 6564 Benson St., Detroit 7.

Prep-Pik-L: Non-fuming, non-corrosive cleaner for removing all types of scale. Neilson Chemical Co., 6563 Benson St., Detroit 7.

Preprite: Paint-receptive rust-retarding phosphate coating on iron and steel surfaces. Neilson Chemical Co., 6564 Benson St., Detroit 7.

Prep-Wash: For cleaning rust removing and preparing metal surfaces in general for painting. Neilson Chemical Co., 6564 Benson St., Detroit 7.

Prepwash: Metal cleaner for mechanical systems already in operation. Neilson Chemical Co., 6564 Benson St., Detroit 7.

Presco: All kinds of electroplating and polishing machines. Plating Equipment & Supply Co., 182 Grand St., New York 13.

Prescoloy: Nickel alloy steel for truck side frames, bolsters, freight car castings. Pressed Steel Car Co., Koppers Bldg., Pittsburgh.

Prescote: Arcwelding electrode for steel; corresponds to AWS E-4510. Standard Steel & Wire Co., Bolivar, Pa.

Press-Veyor: Portable, power-driven endless belt conveyor designed primarily for use in press rooms to convey stampings. Rapids-Standard Co., Inc., Bond and Trowbridge Sts., Grand Rapids 2.

Presteel: Precision stampings and assemblies. Worcester Pressed Steel Co., 411 Barber Ave., Worcester 6.

Presteel: Press-formed metal articles or assemblies of articles, produced by controlled press operations. Worcester Pressed Steel Co., 100 Barber Ave., Worcester.

Presstite: Porcelain for electrical insulating particularly adaptable for use in intricate shaped pieces. Mueller Electric Co., 1570 E. 21st St., Cleveland.

Prestite: Compression-molded "porcelain" and molded parts (colored if desired) of precise intricate shape, such as pump valve seats, blast nozzles, etc. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Presto: Polishing room accessories and equipment; polishing wheels, buffing wheels and buffing composition. Manderscheid Co., 111 W. Fulton St., Chicago 8.

Prest-O-Lite: Acetylene supplied in cylinders; air-acetylene torches for all soldering, brazing, and light heating operations; halide leak-detectors, cylinders for refrigerants, aerosols, liquefied petroleum gases, acetylene, other fuel gases, fumigants, and similar container purposes; packed-type cylinder valves. Prest-O-Lite Co., Inc., and Linde Air Products Co., 30 E. 42nd St., New York 17.

Prest-O-Weld: Blowpipes; regulators; and related equipment for oxyacetylene welding, cutting, forming and treating of metals. Linde Air Products Co., 30 E. 42nd St., New York 17.

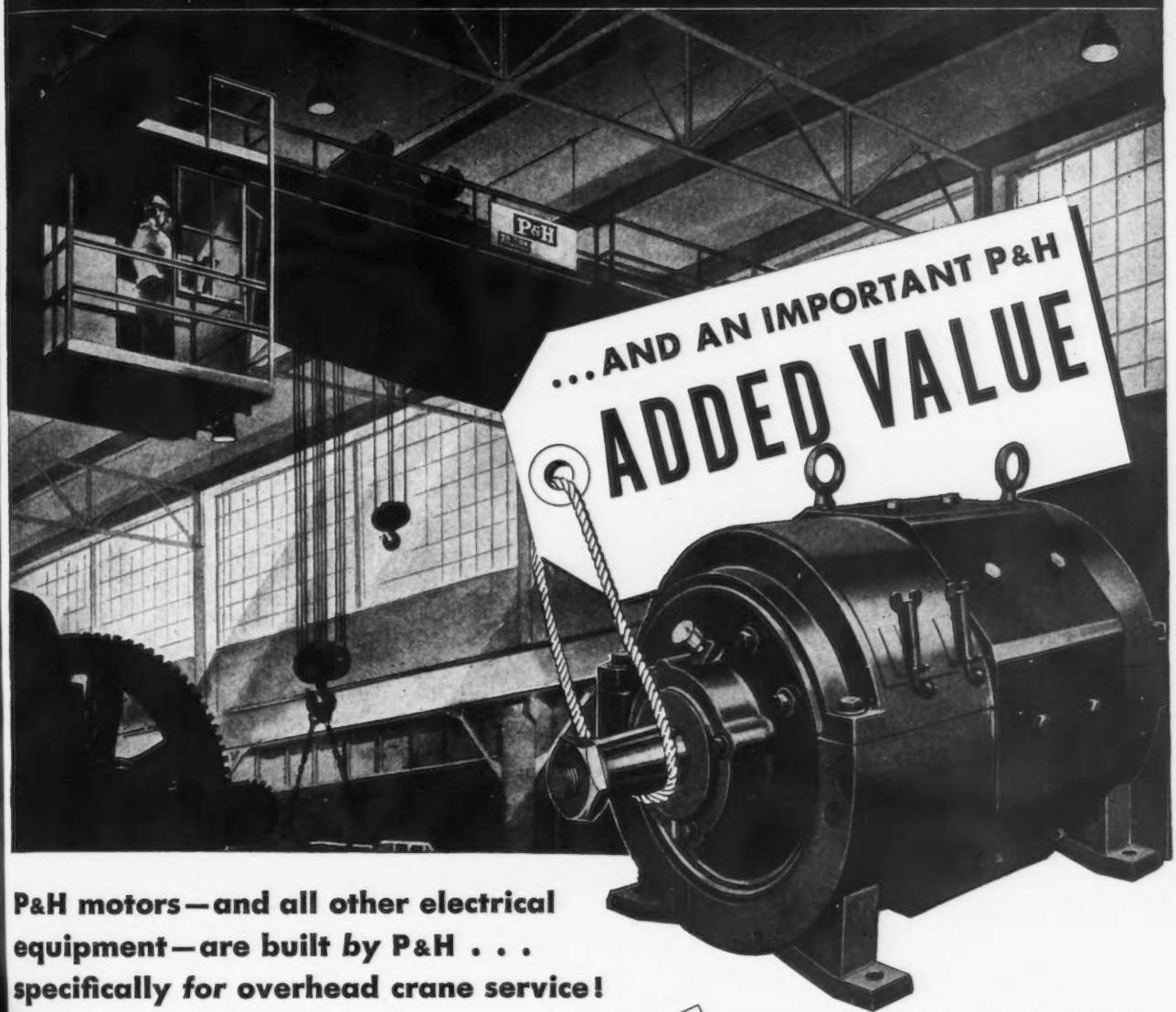
Pressiometer: Device for measuring feed pressure of a power hacksaw blade on work. Miller Falls Co., Greenfield, Mass.

Pressiometer: Instrument for measuring pressure of cut in hacksaw blades. Millers Falls Co., Greenfield, Mass.

Pressure Tite Iron: Centrifugal cast iron for liners, engine sleeves, oil pumps. Janney

MIDGET WALKIE: *Dr. Oscar Lange of Poland, left, listens to an explanation of a tiny radio receiver by Col. L. E. Dostert, chief of the simultaneous interpretation service of the United Nations. The set, which has a 50-ft range, is being tested to permit the delegates to listen to any one of five languages being broadcast during the sessions of the UN Economic and Employment Commission.*

P&H ELECTRICAL EQUIPMENT . . . HEART OF CRANE DEPENDABILITY

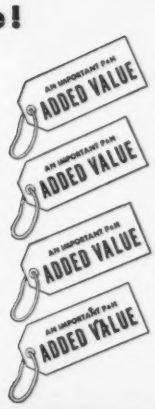


P&H motors—and all other electrical equipment—are built *by* P&H . . . specifically *for* overhead crane service!

The reason why P&H motors are so outstanding is because they incorporate over 60 years of crane motor building.

These rugged P&H motors are specifically designed and built (not adapted) to fully withstand the severities of crane service—to longer endure the rapid accelerations, frequent reversals and numerous shock loads and with far less maintenance.

Following are but a few of the added values in P&H's type "CR" direct current motors:



Extra-large diameter shafts with the duplicate ball bearing equipment at both ends.

Welded rolled steel, split-type frames for ease of maintenance.

Spider mounting makes removal of armature winding easy.

Liberal commutator design with full interpole construction, provides perfect commutation under all load conditions.

FREE ENTERPRISE MEANS:
Better products - for more people - at lower cost

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Cylinder Co., 8037 Frankford Ave., Philadelphia.

Pressuretrol: Pressure regulators. Brown Instrument Co., 4498 Wayne Ave., Philadelphia 44.

Prevok: Rust preventive. Croda, Ltd., Bedford Chambers, Covent Gardens, W. C. 2, England.

Primos: 35-45 V steel in steel manufacturing. Vanadium Corp. of America, Bridgeville, Pa.

Printweigh: Scale producing printed weights on tickets, sheets, or strips. Toledo Scale Co., Toledo.

Prize Ribbon: Sn, Cu, Sb babbitt for bearings. Hewitt Metals Corp., 1918 Stanly St., Detroit.

Probestos: Profiled solid metal gasket with asbestos cord cemented in grooves; especially suited for extreme temperature and pressure service on rough or uneven surfaces. Goetze Gasket & Packing Co., Inc., New Brunswick, N. J.

Proctoil: Anti-rust oil for protection of highly-finished steel parts during manufacture and storage. Du-Lite Chemical Corp., Middletown, Conn.

Procunier: High-Speed tapping and threading equipment. Procunier Safety Chuck Co., 18 S. Clinton St., Chicago 6.

Production: Aluminum-oxide abrasive. Clover Mfg. Co., Norwalk, Conn.

Productimeter: Various types of counting and measuring machines. Durant Manufacturing Co., 1929 N. Buffum St., Milwaukee 1.

Production: Aluminum-oxide abrasive. Clover Mfg. Co., Norwalk, Conn.

Proferall: Cast iron for camshafts. Campbell Wyant & Canon Co., Henry St., Muskegon, Mich.

Profilometer: Electronic instrument for the measurement of surface roughness. Physicists Research Co., 343 S. Main St., Ann Arbor, Mich.

Promal: Malleable cast iron with Si and Mn for cast chains, sprockets, gears, valve parts. Link-Belt Co., 222 S. Belmont Ave., Indianapolis.

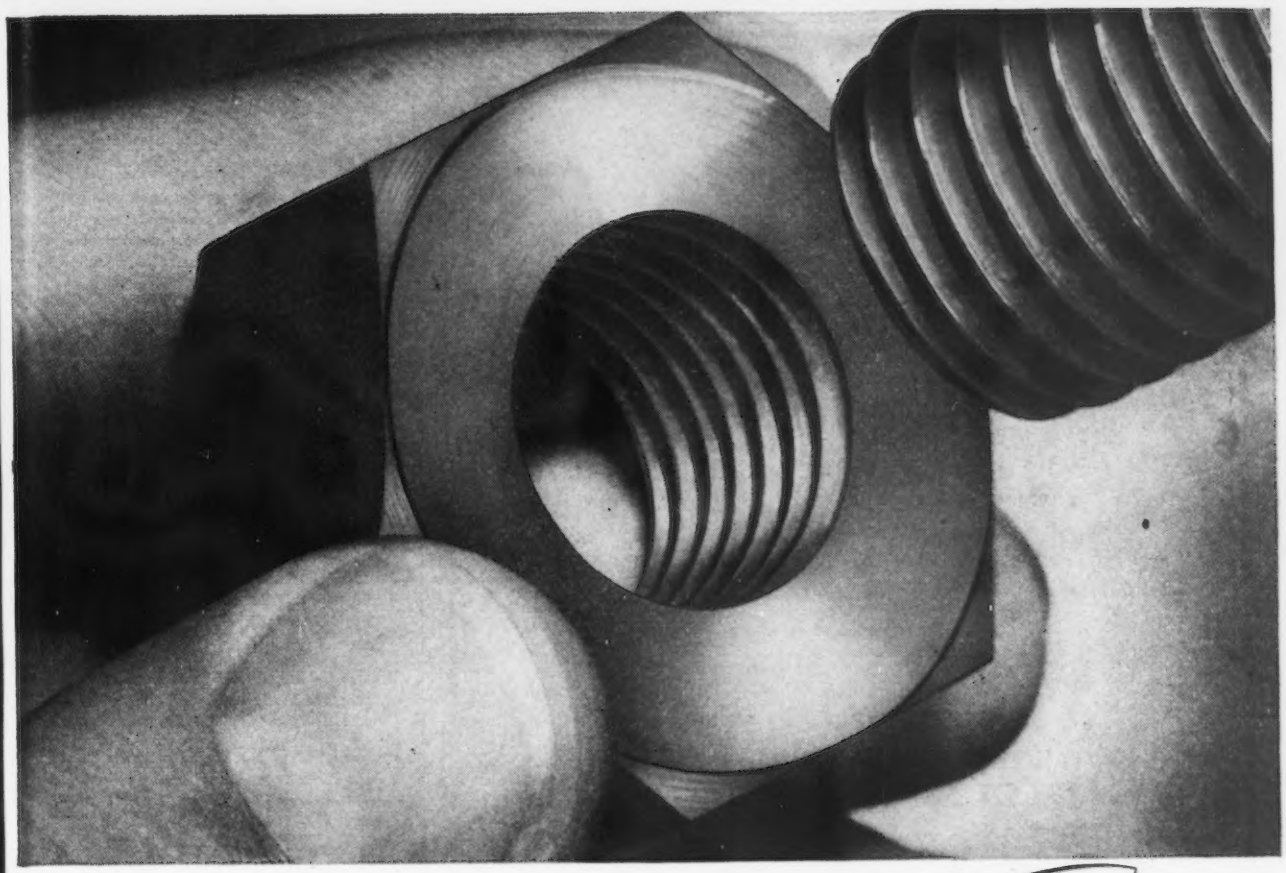
Promal: Malleable cast iron for sprockets, gears. National Malleable & Steel Castings Co., 10600 Quincy St., Cleveland.

Promal: Specially processed malleable iron having high yield and fatigue strength; for resistance to mild corrosive attack, can be hot-dip galvanized without embrittlement and can be used in ovens and furnaces up to 1100°F; uses include conveyor and drive chain links, bearing caps, rocker arms, sheaves, levers, and other machine parts subjected to severe service. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Promal: Used in ovens and furnaces up to 1000°F, and for conveyor and power transmission chains, sprockets and miscellaneous machine parts subjected to severe service. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Promax: Cutting oils and compounds. National Refining Co., Hanna Bldg., Cleveland 15.

Promet: Heat-treated bronze for bearing and



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5. Purchase maximum holding power per dollar of initial cost, by specifying correct type and size of fasteners
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7. Save purchasing time by buying larger quantities from one supplier's complete line
8. Contribute to sales value of final product by using fasteners with a reputation for dependability and finish

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102 years making strong the things that make America strong

RB&W bolts, nuts, screws, rivets and allied fastening products are manufactured in a broad range of styles, sizes and finishes.

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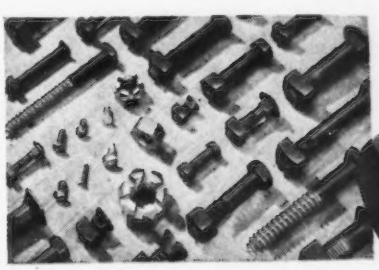
Plants at: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices at: Philadelphia, Detroit, Chicago, Chattanooga, Portland, Seattle. Distributors from coast to coast. By ordering through your distributor, you can get prompt service from his stocks for your normal needs. Also—the industry's most complete, easiest-to-use catalog.



10,000 TRADE NAMES

wearing parts. American Crucible Products Co., Lorain, Ohio.

Prosolv B: Electrolytic plater's cleaner. Turco Products, Inc., Los Angeles 54.

Protal: Process for applying double-oxide protective film on aluminums and aluminum alloys. Aluminum Co. of America, Pittsburgh; Reynolds Metals Co., Louisville.

Pro-Tecto-Cape: Welders garment, designed to provide maximum freedom of movement and ventilation with full protection; underarm protection on overhead welding. Eastern Equipment Co., Inc., Willow Grove, Pa.

Protect-O-Metal: Resistant to heat, sprayed or brushed on diecasting dies, or to prevent collection of spatter on metal surfaces during welding. Geo. W. Smith & Sons, 125 S. Sperling Ave., Dayton 3, Ohio.

Protectal: See Kelcote.

Protect-O-Metal: Arc-welding compound used to prevent adhesion of weld spatter. G. W. Smith & Sons, 125 S. Sperling Ave., Dayton.

Protect-O-Metal Die Slick: Lubricant for diecasting dies and permanent molds. G. W. Smith & Sons, 5400 Kemp Rd., Dayton.

Protectorings: Auxiliary metallic seal used with ring-type joint gaskets in ring-type joint flanges to reduce turbulence at the joint and to minimize corrosion of flange faces and gaskets. Goetze Gasket & Packing Co., Inc., New Brunswick, N. J.

Protex: Non-rust oils and coatings for protecting finished and unfinished metal parts from rusting during shipment, storage and export. Wayne Chemical Products Co., Detroit 17.

Protex A-11-20: Cold-dip oil-base rust preventive for protection of metal parts. Wayne Chemical Products Co., 9302 Copeland Ave., Detroit.

Protex HF-QD: Quick drying, black protective rust preventive. For trucks, tanks and other equipment for export. Wayne Chemical Products Co., 9302 Copeland Ave., Detroit.

P2 Alloy: Highly alloyed cast aluminum alloy for carburetors, brake shoes, pressure die casting. Birmingham Aluminum Casting Co., Ltd., Birmingham, England.

Pul-Lift: Hoists. Yale & Towne Mfg. Co., 4532 Tacony St., Philadelphia 24.

Pullmore Clutches: Multiple-disc, over-center and spring-loaded industrial clutches; power take-offs. Rockford Clutch Div., Borg-Warner Corp., Rockford, Ill.

Pulsing Control Drive: Single-knob precision control for reversible motors. Motor moves in small increments or full speed following slow or fast rotation of the control knob. Used for inching, jogging, accurate positioning. Yardeny Laboratories, Inc., 105 Chambers St., New York 7.

Pulverators: Multi-impact crushers for friable materials. Allis-Chalmers Mfg. Co., Milwaukee 1.

Puralloy: Chilled cast iron (alloy) rolls for paper and allied industries. Lobdell Co., Wilmington 99, Del.

Pur-Blac: Oxidizing salt for producing a black oxidized finish on steel and iron. Puritan Mfg. Co., 29 Benedict St., Waterbury 85, Conn.

10,000 TRADE NAMES

Purico Wonderbar: Presaponified buffing and polishing compositions. Puritan Mfg. Co., 29 Benedict St., Waterbury 85, Conn.

Purite: Sodium carbonate (Na_2CO_3) fused and cast in 2-lb pigs for desulfurizing and refining iron in cupolas and ladles. Mathieson Alkali Works, Inc., 60 E. 42nd St., New York 17.

Purnell(ing): Steel quenching procedure whereby quench is highly uniform and fast, and higher as-quenched hardness obtained by means of propeller agitators in the bath. Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19.

Purnell Process: Steel quenching followed by immediate tempering to improve hardness, impact values and machinability. Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19.

Pur-O-Tin: Metallic tin in bar or ball form for tin plating. E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del.

Purex: Blowpipes, regulators, and related equipment for oxyacetylene welding, cutting, forming, and treating of metals; containers for liquefied gases. Linde Air Products Co., 30 E. 42nd St., New York 17.

Purozinc: Intermediate-grade zinc in bar form for zinc plating. E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del.

Purple Strand: Wire rope, improved plow steel grade. Bethlehem Steel Co., Bethlehem.

P-V Test: Penetration-velocity test to determine hardenability of low and medium-hardening steels. Ingersoll-Rand Co., Phillipsburg, N. J.

Pyle-O-Flex: Explosion-proof, flexible, electrical conduit fittings. Pyle-National Co., Chicago 51.

Pylets: Cast metal conduit fittings. Pyle-National Co., Chicago 51.

Pyluminizing: Surface protection treatment for aluminum. Pyrene Co., Ltd., Great West Road, Brentford, Middlesex, England.

Pyralloy: 14 Cr-medium C Stainless for furnace parts, valves. Brown, Bayley's Ltd., Sheffield, England.

Pyramid: Pb alloy for bearings. Magnolia Metal Co., Elizabeth, N. J.

Pyramid: Various types of pyrometers. Tamms Silica Cement Co., 226 N. LaSalle St., Chicago.

Pyramid Metal: Hard close-grained lead-base babbitt, for railroad, turbine, large motor and rolling-mill bearings, etc. Magnolia Metal Co., 16 W. Jersey St., Elizabeth 4, N. J.

Pyranol: Dielectric compound. General Electric Co., Schenectady.

Pyrasteel: Corrosion and heat-resisting high-nickel chrome steel for corrosion and heat resisting parts. Chicago Steel Foundry Co., 3720 S. Kedzie St., Chicago.

Pyrasteel: Series of Ni-Cr heat-resisting steels for carburizing boxes, furnace parts. Chi-

cago Steel Foundry Co., 3227 W. 37th Place, Chicago.

Pyrasteel: Heat and corrosion-resisting steel; furnace parts, conveyor screws, etc. Chicago Steel Foundry Co., Kedzie Ave. & 37th St., Chicago 32.

Pyrex Precision-Bore Tubes: Boro-silicate precision-bore glass tubes for mechanical parts or flow meter tubes, etc. Corning Glass Works, Corning, N. Y.

Pyro: All types of optical, radiation and surface pyrometers. Pyrometer Instrument Co., 103 Lafayette St., New York.

Pyro: Lightweight optical pyrometer for plant and laboratory. Pyrometer Instrument Co., 103 Lafayette St., New York.

Pyrocast: Cast steel with high Ni-Cr for heat-treating and carburizing boxes. Pacific Foundry Co., Treat at 19th St., San Francisco.

Pyrocon: See Alnor.

Pyrocon: Contact pyrometer for quick, accurate surface temperatures. Illinois Testing Laboratories, Inc., 420 N. La Salle St., Chicago 10.

Pyroflex: Inorganic finish having all the features of porcelain enamel. Wide range of colors and grain finishes. Maurice A. Knight, Settlement St., Akron, Ohio.

Pyrogrip: Cold cement for dressing polishing wheels. Pyrene Co., Ltd., Great West Road, Brentford, Middlesex, England.

Pyromaster: Self-balancing potentiometer for recording, indicating and controlling industrial processes. Bristol Co., Waterbury 91, Conn.

Pyromic: High Ni, Cr alloys with or without Fe for electrical resistances. Telegraph Construction & Maintenance Co., Ltd., London, England.

Pyros: High-nickel alloy with Cr-Fe-W-Mn; for high heat resistance in dilatometric temperature control devices. Soc. Anon. de Commentry Fourchambault et Decazeville, Paris, France; R. Y. Ferner Co., Investment Bldg., Washington.

Pyrotron: Electronic-type instrument for indicating, recording and controlling temperatures. Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland 10.

— Q —

Q-Alloy: Heat and corrosion-resistant high-nickel chrome-iron alloys for furnace parts and heat-treating boxes. General Alloys Co., 401 West First St., Boston.

Q-Alloy: Nickel-chrome alloy with iron for furnace parts. General Alloys Co., 401 W. First St., Boston 27.

Q-Chromastic: Plastic super-refractory for veneer coating of furnace walls. Quigley Co., Inc., 527 Fifth Ave., New York 17.

Q-Chrome: Neutral-base refractory with very high fusion point for lining steel furnaces, soaking pits, smelting furnaces, etc. Quigley Co., Inc., 527 Fifth Ave., New York 17.

Q-Chrome: Neutral-base refractory cement for furnace construction. Quigley Co., Inc., 527 Fifth Ave., New York.

Q-Co: Fire brick. Quigley Co., Inc., 527 Fifth Ave., New York 17.

QM Electro Squares: Thin form of electrolytic nickel providing quick melting addition in nickel, brasses and bronzes. International Nickel Co., Inc., 67 Wall St., New York 5.

Q R Glass: High heat duty fireclay brick. North American Refractories Co., 1012 National City Bank Bldg., Cleveland 14.

Q-Seal: Joint sealing compound for lines carrying high-pressure steam, oil, gasoline and solvents. Quigley Co., Inc., 527 Fifth Ave., New York 17.

Q-T Oils: Complete line of oils for all quenching and tempering purposes. Cities Service Oil Co., Bartlesville, Okla.

QT Oils: For quenching and tempering of metals. Cities Service Oil Cos., 70 Pine St., New York 5.

QueLarc: Plugs, receptacles and electrical connectors. Pyle-National Co., Chicago 51.

Quick-as-Wink: Complete line of air and hydraulic control valves. C. B. Hunt & Son, Inc., Salem, Ohio.

Quick-Clean: Textile motors. Allis-Chalmers Mfg. Co., Milwaukee 1.

Quicklift: Industrial trucks. Lewis-Shepard Products Inc., 286 Walnut St., Watertown, Mass.

Quick Mend: Solder. L. B. Allen Co., Inc., 6759 Bryn Mawr Ave., Chicago.

Quicksaw: Portable electric saw for cut-off work and all types of sawing operations, wood, metal and composition metals; used with various blades and disks. Black & Decker Mfg. Co., Towson 4, Md.

Quick Temper: Drawing and tempering salts for temperature ranges 275° to 1200°F; very liquid at operating temperatures, low drag-out. Mitchell-Bradford Chemical Co., 2446 Main St., Bridgeport, Conn.

Quikwerk Tools: Special openhearth carbon-steel tools. Warren Tool Corp., Warren, Ohio.

Quoit: Cast anodes in nickel, copper, brass, zinc, lead, bronze, etc. Hanson-Van Winkle-Munning Co., Matawan, N. J.

— R —

Rack-Lac: Insulating material for the protection of plating racks; also, an insulating tape for the protection of plating racks. E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del.

Raco: Automatic arc welding electrode. Reid-Avery Co., Baltimore, Md.

Raco: Heavily coated welding electrodes in coils. Reid-Avery Co., Inc., Cleveland & Chesapeak Aves., Baltimore 22.

Raco Composite Type A: Electrode designed specifically for automatic arc welding. Reid-Avery Co., Cleveland & Chesapeake Aves., Baltimore.

Racolloy: Series of arcwelding electrodes for stainless steel and armor plate. Reid-Avery Co., Cleveland & Chesapeak Aves., Dundalk, Baltimore 22.

Radiametal: Fe alloy with 47 Ni for electrical

equipment. Allegheny Ludlum Steel Corp., Brackenridge, Pa.

Radiamatic: Pyrometers. Brown Instrument Co., 4498 Wayne Ave., Philadelphia 44.

Radianite: Cutlery-type stainless for knives and other cutting utensils and stainless articles. Latrobe Electric Steel Co., Latrobe, Pa.

Radiohm: 12 Cr, 4 Al iron alloy for radio tube parts, resistors. Driver-Harris Co., Harrison, N. J.

Radiotherm: X-ray apparatus. Westinghouse Electric Corp., East Pittsburgh, Pa.

Radium A: Bearing babbitt. Hewitt Metals Corp., 1918 Stanley St., Detroit.

Rail End: Cr-Mo-V steel hard-facing electrode for battered rail ends. Champion Rivet Co., Harvard & E. 108th St., Cleveland.

Rail-O-Road: Mobile swing-boom crane that operates on or off standard railroad tracks. Silent Hoist & Crane Co., 841 63rd St., Brooklyn 20.

Railway Axle Box: Bronze for castings, bearings. A. Cohn, Ltd., London, England.

Railwear: Coated hard-surfacing electrode for rail joints. Hollup Corp., 4700 W. 19th St., Chicago.

Rainbow Strand: Steel rope. Rochester Ropes, Inc., Culpeper, Va.

Rainier: See Philo.

Ram Brand: Low-carbon high-purity iron for chains, chain hooks, stay bolts, locomotive parts. Kloster Steel Co., 226 N. Justine St., Chicago.

Ram's Head: Complete line of steel marking stamps, type holders, machine stamps, embossing dies, etching equipment, etc. Acme Marking Equipment Co., 2222 W. Fort St., Detroit 16.

Ramet: Sintered carbide (tungsten, titanium, columbium, tantalum) blanks, tools, dies and special shapes. Vascoloy-Ramet Corp., North Chicago, Ill.

Ramix: Air-setting, high-magnesia refractory for rammed hearths and cold repairs in basic openhearth and basic electric steel furnaces. Basic Refractories, Inc., 845 Hanna Bldg., Cleveland 15.

Ramix: Cold-ramming high-magnesia refractory for openhearths and electric furnaces. Basic Refractories, Inc., Hanna Bldg., Cleveland.

Ramset: High-magnesia granular refractory for ramming and hot patching metallurgical furnaces. Basic Refractories Corp., 845 Hanna Bldg., Cleveland 15.

Ramsey: Silent chain drives with roller bearing joint in each chain. Ramsey Chain Co., Inc., Albany 1.

Ramtite: Fireclay plastic refractory which comes in moist, plastic consistency ready to be rammed into monolithic refractory lining. Ramtite Co., 2563 W. 18th St., Chicago 8.

Ranalloy: Series of hard-facing electrodes. United States Steel Supply Co., 1319 W. Wabansia St., Chicago.

Randall: Bolt clippers. H. K. Porter, 50 Ashland St., Everett, Mass.

Ranger: Barbed wire. American Steel & Wire Co., Rockefeller Bldg., Cleveland 13.

Rapidry: Core oil for foundry use. Certified Core Oil Div., Socony-Vacuum Oil Co., Inc., 3308 S. Cicero Ave., Cicero, Ill.

Rapid - Flame - Hardened: Hardening process. Rapids-Standard Co., Inc., Bond and Trowbridge Sts., Grand Rapids 2.

Rapid Power Booster: Portable, power belt conveyor. Rapids-Standard Co., Inc., Bond and Trowbridge Sts., Grand Rapids 2.

Rapidstone: Plaster for making molds in which metals are to be precision cast. Kerr Dental Mfg. Co., 6083 12th St., Detroit.

Rapid-Wheel: Gravity conveyor. Rapid-Standard Co., Inc., Dept. HS-67, 308 Peoples National Bank Bldg., Grand Rapids 2.

Rapid-Wheel Gravity Conveyor: Portable, gravity wheel conveyor for conveying boxed or packaged materials. Rapids-Standard Co., Inc., Bond and Trowbridge Sts., Grand Rapids 2.

Rathbone: Cold-drawn special profile sections and pinion rod to accurate dimensions for production of machine parts and gears. A. B. & J. Rathbone, Palmer, Mass.

Ratiotrol: Diaphragm control regulator, mixer and valve designed to afford single-valve control of the air and fuel (gas or oil) volume to one or more industrial burners, while accurately holding a mixture ratio as preadjusted. Positive fuel shutoff is also attained. North American Mfg. Co., 2910 E. 75th St., Cleveland 4.

Raybestos: Asbestos products, packing, friction materials and rubber products. Raybestos Div., Bridgeport, Conn.

Raymax: Continuously evacuated X-ray crystallographic unit for experimental analyses. Metropolitan Vickers Electrical Co., Ltd., Trafford Park, Manchester 17, England.

Rayotube: Temperature-detecting units; unaffected by hot corrosive gases. Leeds & Northrup Co., 4940 Stenton Ave., Philadelphia 44.

Reading: Cranes and hoists. Reading Chain & Block Corp., Reading, Pa.

Ready-Flow: Silver brazing alloy (56 pct) for variety of brazing operations, especially joining dissimilar metals and where a low melting point is needed. American Platinum Works, 231 N. J. R. R. Ave., Newark, N. J.

Ready-Power: Electric and gas-electric power trucks. Ready-Power Co., 3822 Grand River Ave., Detroit 8.

Readyweld: Steel welding rod. Lincoln Electric Co., 12818 Coit Rd., Cleveland.

Recordak: Machine for making accurate copies of checks, waybills, sales tickets or other important papers. Eastman Kodak Co., Rochester 4, N. Y.

Rectoplater: Magnesium-copper-sulphide rectifiers for battery charging and electroplating installations. P. R. Mallory & Co., Inc., Indianapolis 6.

Welded Design Cuts Machine's Cost 60%

BY H. H. STAHL, DISTRICT MANAGER AND WELDING ENGINEER, THE LINCOLN ELECTRIC CO., BOSTON, MASS.

A striking example of a present-day trend in machine design is the evolution of a strawboard shear machine made by Hobbs Manufacturing Co., Worcester, Mass.

Redesign of this machine for fabrication by electric arc welding resulted in a machine with a weight of only one-third that of the original and costing 60% less to produce.

In the former design (see Fig. 1), the various parts of the shear were made in individual pieces and had to be hand-fitted, drilled and bolted. All of these operations were eliminated by the welded design (see Fig. 2), which utilizes rolled steel in standard angles and plate sizes.

FIG. 1—OLD DESIGN. *This shear was made in individual pieces that had to be hand-fitted, drilled and bolted. Line production system was impossible.*

THE DESIGN PROBLEM

In changing over the design to welded steel construction, the manufacturer analyzed the load requirements of the frame which consists essentially of four legs acting as columns and braces acting as beams. Resistance to deflection was the main consideration.

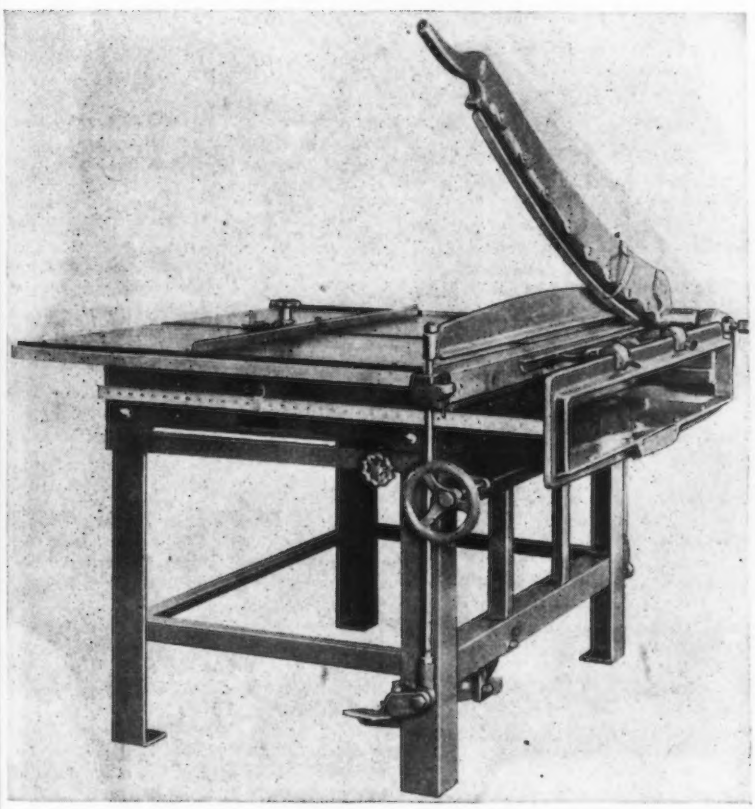


FIG. 2—WELDED DESIGN. *Hobbs engineers redesigned the shear for fabrication by arc welding. The new machine costs 60% less, weighs two-thirds less and is made by line production methods.*

For example, in studying the problem in light of the usual beam formula (see Page 496, 8th Edition, Lincoln Procedure Handbook), comparison can be made of the size of steel angles needed to replace the old material.

In simple designs such as this, however, the common sense formula, based on experience, should prevail. Sizes of members should be governed also by uncalculable demands of handling and shipment, when the machine often gets its roughest treatment.

PRODUCTION PROCEDURE

The simple angle iron and plate design of the frame (see Fig. 2) permits a standardized line production. Angles and plate are shear cut to size, are fitted up in a simple welded fixture and tack welded. All joints are fillets or square butts, requiring no bevelling. Tacked assembly is then placed in a positioner and finish welded . . . all joints downhand for maximum speed. A little grinding off of corner welds of top table and drilling for attachments is all the machining that's required.

A series of Studies in Machine Design are published by The Lincoln Electric Company and are available without charge to engineers and designers. They may be obtained by writing The Lincoln Electric Company, Dept. 142, Cleveland 1, Ohio.

Rectox: Rectifiers. Westinghouse Electric Corp., E. Pittsburgh.

Redalloy: Brass for condenser tubes, heat exchanger tubes. Chase Brass & Copper Co., Inc., Waterbury, Conn.

Red Arrow: Cobalt-chromium-tungsten alloy welding rods and castings to withstand severe wear and impact. Latrobe Electric Steel Co., Latrobe, Pa.

Red Circle: Iron alloy for chilled cast-iron rolls. Hyde Park Foundry & Machine Co., Hyde Park, Pa.

Red Devil: See Blue Devil.

Red Devil: Arcwelding electrodes for steel. Champion Rivet Co., Harvard Ave. & E. 108th St., Cleveland 5.

Red-E-To-Use: Cloth polishing wheels and buffs. Hanson-Van Winkle-Munning Co., Matawan, N. J.

Red Fox: Series of Fe-alloys for furnace parts, exhaust valves, fire bars, pyrometer tubes, skids, rails. Samuel Fox & Co., Ltd., Sheffield, England.

Redington: Counting machines; cartoning, packaging, wrapping and labeling machines. F. B. Redington Co., 112 S. Sangamon St., Chicago 7.

Redi-Paint: Compound for preparing galvanized metal for painting. Turco Products, Inc., Los Angeles 54.

Red Star Brand: Cement-coated nails. Bethlehem Steel Co., Bethlehem.

Red Strand: See Hercules.

Red Streak: Hand lift trucks. Yale & Towne Mfg. Co., 4532 Tacony St., Philadelphia 24.

Red Streak Flanges: Patented feature used on resinoid-bonded snagging wheels. Abrasive Co. Div. of Simonds Saw & Steel Co., Philadelphia 27.

Red-Stripe: Emery cloth. Clover Mfg. Co., Norwalk, Conn.

Red Tip: See Yellow Tip.

Red-Top: Circular electromagnets for handling of scrap, rolls, bars, pigs, and other magnetic materials. Cutler-Hammer, Inc., 315 N. 12th St., Milwaukee 1.

Red-White: Arcwelding electrode for steel; corresponds to AWS E-6012. American Agile Corp. 5806 Hough Ave., Cleveland 3.

Red White and Blue: Carton carpet tacks. American Steel & Wire Co., Cleveland 13.

Redux: Plastic adhesive for metal-to-metal or metal-to-nonmetal joints. Sonntag Scientific Corp., Philadelphia.

Red-X: Aluminum alloys with Cu-Mg-Si-Mn for light alloy parts, permanent mold castings, pistons. National Smelting Co., 6700 Grant St., Cleveland.

Reed & Prince: Recessed-head wood, machine and sheet-metal screws and store bolts; also screw drivers and bits. Reed & Prince Mfg. Co., 1 Duncan Ave., Worcester 1, Mass.

Reelite: Electrical extension cord on a self-rewinding enclosed reel. Appleton Electric Co., 1701 Wellington Ave., Chicago 13.

Reflectoscope: Supersonic machine for inspection of solid objects. Sperry Products, Inc., Willow Ave., Hoboken, N. J.

Reformend: Welding electrode for cast iron. Arcos Corp., 1515 Locust St., Philadelphia.

Refractolux: Luminaires. Westinghouse Electric Corp., East Pittsburgh, Pa.

Rego: Welding and cutting torches and tips; machine-cutting torches and tips. National Cylinder Gas Co., 205 W. Wacker Dr., Chicago 6.

Regulator-Rule: Calculating device for the slide-rule type. Allis-Chalmers Mfg. Co., Milwaukee 1.

Regulex: Electronic control systems for rolling mills and other manufacturing operations. Allis-Chalmers, Milwaukee 1.

Regulex: Exciter for quick response wide range control of dc machines. Allis-Chalmers Mfg. Co., Milwaukee 1.

Reilly Carbon: High-purity commercial carbon for industrial purposes. Reilly Tar & Chemical Corp., Merchants Bank Bldg., Indianapolis 4.

Reinaluminum: Commercially pure aluminum for chemical apparatus, tanks, dairy applications. Vereinigte Leichtmetall Werke, G.m.b.H., Hanover-Linden, Germany.

Reinnickel: Pure nickel for corrosion resistance in chemical and food handling equipment. Vereinigte Deutsche Nickelwerke, A. G. Schwerte, Ruhr, Germany.

Relatrol: Sensitive control relay, interwired in the slidewire circuit existing between a potentiometer type control instrument and a positioning motor for regulating valves, burners or dampers, providing straight proportioning control. Automatic Temperature Control Co., Inc., 34 E. Logan St., Philadelphia 44.

Reliance: Electrical motors and generators, m-g sets, all-electric adjustable-speed drives, electrical speed indicators. Reliance Electric & Engineering Co., 1068 Ivanhoe Rd., Cleveland 10.

Reliance: High heat duty fireclay brick. North American Refractories Co., 1012 National City Bank Bldg., Cleveland 14.

Reliance: High-speed punch presses. Harrington-Wilson-Brown Co., 405 Lexington Ave., New York 17.

Reliance: Iron and copper wire and cables; weatherproof wire. American Steel & Wire Co., Rockefeller Bldg., Cleveland 13.

Reliance: Steel Castings. Reliance Steel Casting Co., 2813 Smallman St., Pittsburgh.

Relleum: Brass for forgings. Mueller Brass Co., Port Huron, Mich.

Rely: Series of copper-tin-lead-antimony bearings. Rely Metal Works, Cape Town, South Africa.

Remalloy: See Comol.

Remalloy: 17 Mo, 12 Co, 71 Fe alloy for permanent magnets. Bell Telephone Laboratories, 463 West St., New York.

Remanit: Series of high Cr, low Ni stainless steels for corrosion-resistant parts. Deutsche Edelstahlwerke A. G., Krefeld, Germany.

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10,000 TRADE NAMES

Remmey: Corundum and crystalline mallite refractories. Richard C. Remmey Son Co., Philadelphia 37.

Remover Alpha: Zinc chromate primer stripper. Turco Products, Inc., Los Angeles 54.

Res-Bond: Resin-bonded coated abrasives. Clover Mfg. Co., Norwalk, Conn.

Rescon: Anti-corona compound. General Electric Co., Schenectady.

Resilia: Si-Mn steel for springs. Bethlehem Steel Co., Bethlehem.

Resin Cement-702: Phenol-formaldehyde resin-base cement which resists steam, solvents and all acids except nitric. Ceilcote Co., 750 Rockefeller Bldg., Cleveland.

Resin X-Crepe: Plastic molding—laminating material for forming laminated irregular shapes having high physical strength. Cincinnati Industries, Inc., Cincinnati (Lockland).

Resinox: Laminating, grinding wheel, brake lining and liquid resins. Monsanto Chemical Co., Springfield 2, Mass.

Resinox: Phenol formaldehyde plastics filled respectively with wood flour, flock, fabric, cord, special fabric and mica. Monsanto Chemical Co., Plastics Div., Springfield, Mass.

Resistac: Series of copper alloys with Al-Fe for acid-resisting castings and forgings, chemical apparatus and equipment. American Manganese Bronze Co., 4797 Rhawn St., Philadelphia.

Resistaloy Bronze: 59 Cu with Zn, Al-Ni-Si-Fe, for shafts, bearings, bolts, forgings. Titan Metal Mfg. Co., Sieg & Craig Sts., Bellefonte, Pa.

Resistoflex: Tubing made from flexible synthetic resin, insoluble in gasoline, oil, ether, and alcohol; fuel and brake lines, in lubrication systems, in chemical and process industries for conveying solvents and oils. Resistoflex Corp., Belleville, N. J.

Resisto-loy: Hard-surfacing metal for shovel teeth, dredging tools, dies. Resistoloy Co., Baylis at Buchanan Ave., Grand Rapids.

Resistwear: Hard-surfacing rod developed by American Manganese Steel Div., American Brake Shoe Co., Chicago Heights, Ill.

Resizing: Reamers and end mills enlarged by forging. Abrasive Engineering Corp., Spring Lake, Mich.

Resurfacer: For repairing ruts, holes, and breaks as well as for complete overlays over wood and concrete floors. Stonhard Co., 401 N. Broad St., Philadelphia 8.

Retract-A-Tool: Cutting tool holder for lathes which automatically retracts at a predetermined point of the carriage travel. For internal and external thread chasing. Foulk Mfg. Co., 4208 Airport Rd., Cincinnati 26.

Retract-O-Reel: Enclosed reel for lifting and holding tools up over work and out of way when not in use. Appleton Electric Co., 1701 Wellington Ave., Chicago 13.

Revel: Scouring and polishing compound. Turco Products, Inc., Los Angeles 54.

Revivifier: Aerating molding sand. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

10,000 TRADE NAMES

Revivo: Bonding clays for foundry sands. Eastern Clay Products, Inc., Eifort, Ohio.

Reynolds: Corliss engines, compressors and pumping engines. Allis-Chalmers Mfg. Co., Milwaukee 1.

Reyrolle: Metal-clad switchgear. Allis-Chalmers Mfg. Co., Milwaukee 1.

Rex: Al-Cu welding rod for Al alloys and Fe welding rod for cast iron. Hollup Corp., 4700 W. 19th St., Chicago.

Rex Babbitt: Babbitt. American Brake Shoe Co., 230 Park Ave., New York 17.

Rex Bronze: Bronze for castings. Whipple & Choate Co., Bridgeport, Conn.

Rex-Flex: Stainless steel flexible tubing. Chicago Metal Hose Corp., 1319 S. Third Ave., Maywood, Ill.

Rex Z Metal: Alloy steel for chains, buckets, sprockets. Chain Belt Co., Milwaukee 4.

Reyrolle: Metal-clad switchgear. Allis-Chalmers Mfg. Co., Milwaukee 1.

Rezistal: Series of corrosion resistant Cr-Ni steels for stainless parts and furnace, oil, pump parts and acid tanks; also electrodes for welding stainless steel. Crucible Steel Co. of America, Chrysler Bldg., New York 17.

Reznor Unit Heater: Fan, blower and duct types, suspended, gasfired unit heaters. Reznor Mfg. Co., Mercer, Pa.

RH 309 Brightener: Used in conjunction with the Durobrite zinc plating process to improve covering power. E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del.

RH 553: High-speed copper-plating salts; sodium formulation, for steel, diecastings, wire and other parts. E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del.

RH 556: Used with high-speed copper-plating salts to prevent pitting. E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del.

RH 661: High-speed copper-plating salts, potassium formulation, for steel, diecastings, wire and other parts. E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del.

RH 774: Anti-pitting agent for high-speed copper plating; anti-fume agent for Durobrite zinc plating. E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del.

RH 1032 and 1085: Anti-pitting agents for high-speed copper plating. E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del.

Rhenium: 99.5-pct rhenium for addition to alloying metals. Vereinigte Chemische Fabriken, Leopoldshall, Germany.

Rhodium: Johnson Mattey plating solutions. A. Robinson & Son, 131 Canal St., New York 2.

Rhometal: 36 Ni, 64 Fe alloy for high-frequency electrical circuits. Telegraph Construction & Maintenance Co., Ltd., London, England.

Rialto: Elevator buckets. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Ribflex: Vitreous enameled resistor consisting

of a ribbon resistive element wound on a refractory base. Ward Leonard, 31 South St., Mt. Vernon, N. Y.

Ribohm: A resistor consisting of a resistance alloy ribbon shallow channel shaped formed into a V. Ward Leonard, 31 South St., Mt. Vernon, N. Y.

Ridoline: Granular alkaline cleaners for steel. American Chemical Paint Co., Ambler, Pa.

Ridosol: Addition agents to be added to alkali cleaning solutions; very effective in improving the detergent power. American Chemical Paint Co., Ambler, Pa.

Ridoxine: Chemical used in heat treating. Changes nature of scale to facilitate removal. American Chemical Paint Co., Ambler, Pa.

Riehl: Narrow-faced power driven brushing wheels. Fine wire sections excellent for platers' use and the brushing of art metal goods, builders' hardware, etc. Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14.

Rigid Back: Serrated-blade milling cutters, gear and form-relieved cutters, etc. Cowles Tool Co., 2086 W. 110th St., Cleveland 2.

Rigidcut: Milling cutters. Wesson Co., 1222 Woodward Heights Blvd., Ferndale 20, Mich.

Rigidizing: See Rigidtex.

Rigidtex: Cold-rolling process (in patterns) for stainless steel to increase rigidity. Rigid-Tex Corp., Buffalo.

Ringlock: Small-diameter brushing wheel sections suitable for use on portable tools, for cleaning, brushing, burring, removing rust, scale, etc., from internal or hard-to-reach places. Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14.

Ripl-Flo: Combination eccentric-inertia type inclined vibrating screen. Allis-Chalmers Mfg. Co., Milwaukee 1.

Ripple: Sewed-pieced buff with special sewing. F. L. & J. C. Codman Co., Rockland, Mass.

Riser-X: Exothermic powder developing temperatures in vicinity of 2950°F, for use in risers to reduce shrinkage and in ingots to reduce piping. Chromium Mining & Smelting Corp., Ltd., Sault Ste. Marie, Ontario.

Rita Alloy: Mn-Cr-Ni alloy steel for special purposes. Cannon-Stein Steel Co., 797 S. State St., Syracuse, N. Y.

Rite-Moldcote: Coating for ingot molds. Conrad Wolff, P. O. Box 448, Irvington, N. J.

Riverside: Free-cutting brass with Ni, 1.5 Pb for screw-machine parts. Riverside Metal Co., Riverside, N. J.

Riverside Beryllium Copper: Corrosion-resistant copper with 2-2.5 Be; for springs, clips, bearings. Riverside Metal Co., Riverside, N. J.

Riverside Nickel Silver: Series of copper-nickel-zinc alloys for springs, silverware, cutlery. Riverside Metal Co., Riverside, N. J.

Riverside Phosphor Bronze: Bronze with 0.05-0.35 P and Zn-Fe for springs and contacts in radio and electrical equipment, fuse clips, worm wheels. Riverside Metal Co., Riverside, N. J.

Rivetless: Drop forged steel chains. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Rivnuts: Fasteners for blind riveting, flush fastening, other difficult assembly jobs. B. F. Goodrich Co., Akron, Ohio.

R-M: Asbestos products, packing, friction material and rubber products. Raybestos-Manhattan, Inc., 61 Willett St., Passaic, N. J.

"R" Monel: Ni-Cu alloy, free cutting for high-speed machining; for intricate machined parts and automatic screw machined parts. International Nickel Co., 67 Wall St., New York.

Robins: General line of materials-handling machinery. Robins Conveyors, Inc., 270 Passaic Ave., Passaic, N. J.

Robins: Series of cast irons with T.C., C.C., Si, Cr, Ni for gray iron castings, gears. Robins Conveying Belt Co., 70 Pine St., New York.

Robins-Mead Morrison: Hoisting machinery. Robins Conveyors, Inc., 270 Passaic Ave., Passaic, N. J.

Robins Messiter: Ore bedding and reclaiming systems. Robins Conveyors, Inc., 270 Passaic Ave., Passaic, N. J.

Robins Ni-Hard: Iron alloy with Si, Mn, Ni, Cr for rolling mill guides, crusher segments, liners, rolls. Robins Conveying Belt Co., 70 Pine St., New York.

Robinson: Fire brick. Robinson Clay Products Co., Akron 9, Ohio.

Robinson's Assayed: Gold-plating solutions for flash work and general job plating. A. Robinson & Son, 131 Canal St., New York 2.

Robinsul: Insulating fire brick. Robinson Clay Products Co., Akron 9, Ohio.

Rocan: Electrolytic copper for conduits, sheeting. Revere Copper & Brass Co., 230 Park Ave., New York.

Rocheltex: Copper addition agent for accelerating cyanide copper plating. MacDermid, Inc., Waterbury 88, Conn.

Rochester: Wire rope. Rochester Ropes, Inc., Culpeper, Va.

Rockbestos: Electrical cables with impregnated asbestos insulation. Rockbestos Products Corp., 147 Nicoll St., New Haven 4, Conn.

Rockford Clutches: Automotive and industrial clutches and power take-offs. Rockford

Clutch Div., Borg-Warner Corp., Rockford, Ill.

Rocking Contact: Generator voltage regulators. Allis-Chalmers Mfg. Co., Milwaukee 1.

Rockite: Hard tread composition wheels for industrial truck casters. Faultless Caster Corp., Evansville 7, Ind.

Rockrite: Iron alloy for bearings, liners. Tube Reducing Corp., 532 Main Ave., Wallington, N. J.

Rockwell: Instrument for measurement of hardness of all sorts of metals and alloys, hard or soft, polished or unpolished, flat, round, tubular or odd in shape. Wilson Mechanical Instrument Co., Inc., 383 Concord Ave., New York 54.

Rockwell Superficial: Instrument for measurement of hardness of thin sheet, nitrided steel, and lightly carburized steel. Wilson Mechanical Instrument Co., 383 Concord Ave., New York 54.

Rodine: Added to pickle baths to confine the acid's action to the removal of scale and rust. Minimizes escape of acid fumes from the pickle tank, reduces acid consumption and prevents pitting and overpickling. American Chemical Paint Co., Ambler, Pa.

Roebling: General designation for all company products. John A. Roebling's Sons Co., Trenton 2, N. J.

Roecord: High grade plain rubber jacketed Type "S" cord with yarn fillers. John A. Roebling's Sons Co., Trenton 2, N. J.

Roegal: Galvanized steel wire which has been drawn after galvanizing and which has same strength as bright wire of the same grade. John A. Roebling's Sons Co., Trenton 2, N. J.

Roeglas: Fiber glass insulation as applied to magnet wire. John A. Roebling's Sons Co., Trenton 2, N. J.

Roeplastic: Thermoplastic insulation. John A. Roebling's Sons Co., Trenton 2, N. J.

Roe-Slot: Sizing screen with very long openings designed to prevent blinding or clogging of openings. John A. Roebling's Sons Co., Trenton 2, N. J.

Roe-Ton: Sizing screen with rectangular mesh designed to give greater open area and higher production when grading and sizing coal, coke, slag and ores. John A. Roebling's Sons Co., Trenton 2, N. J.

Roevar: Formvar insulation for magnet wire. John A. Roebling's Sons Co., Trenton 2, N. J.

Roeweld: Plain rubber sheath welding cable. John A. Roebling's Sons Co., Trenton 2, N. J.

Ro-Flo: Single-stage rotary air compressors or dry vacuum pumps. Allis-Chalmers Mfg. Co., Milwaukee 1.

Rogers: Vertical turret mills for boring, drilling, turning and threading ferrous and nonferrous castings and forgings. Rogers Machine Works, Inc., 1807 Elmwood Ave., Buffalo 7.

Rohco: Spray preventative for chromium plating baths. R. O. Hull & Co., 1279 W. 3rd St., Cleveland 13.

Rokbore: High-carbon steel for hollow mine drills. Samuel Fox & Co., Ltd., Sheffield, England.

Rolex: Hard-surfacing electrode for carbon steels. Metal & Thermit Corp., 120 Broadway, New York.

Rol-Man: Austenitic manganese steel for wear plates, pins, bushings, woven wire screens. Manganese Steel Forge Co., Allen St. & Castor Ave., Philadelphia.

Rolox: Vinyl white coating enamel with maximum resistance to food acids and fats. Roxalin Flexible Finishes, Inc., Elizabeth, N. J.

Ronensil: Nonmagnetic stainless steel for tableware, household utensils. Rochling-Buderus A. G., Wetzlar, Germany.

Ronstabent Cranes: Hook and magnet mobile cranes. Hughes-Keenan Co., 571 Newman St., Mansfield, Ohio.

Ro-Twin: Two-stage rotary air compressor or dry vacuum pump. Allis-Chalmers Mfg. Co., Milwaukee 1.

Roofloy: High strength lead sheet for roofing. Revere Copper & Brass, Inc., 230 Park Ave., New York 17.

Roofloy: Pb alloy rolled sheet for roofing. Symington Co., Rochester, N. Y.

Rose Coke: Petroleum coke. American Smelting & Refining Co., Rosita, Mexico.

Rosiclare Brand Fluorspar: Fluorspar produced by the Rosiclare Lead & Fluorspar Mining Co., Rosiclare, Ill., and sold exclusively by Oglebay, Norton & Co., 1208 Hanna Bldg., Cleveland.

Rosinal: Liquid core binder used as blending agent with drying oils or with core sand to produce smooth uniform rosin sand cores. Cities Service Oil Co., Bartlesville, Okla.

Ross-Meehan: Steel for castings. Ross-Meehan Foundry Co., Chattanooga, Tenn.

Rotamatic: Automatic electroplating equipment. W. Canning & Co., Ltd., Great Hampton St., Birmingham 18, England.

Rotameter: See Flowrator.

Rotas: Plain carbon steel for case-hardened parts. Worthington Steel & Annealing Co., Sheffield, England.

Rotoblast: Airless centrifugal blast cleaning equipment; abrasive thrown against work from a rapidly spinning, vaned wheel. Pangborn Corp., Hagerstown, Md.

Roto-Clones: Dust arresters for foundries and other industrial applications. American Air Filter Co., 202 Central Ave., Louisville 8, Ky.

Roto-Finish: Mechanical equipment for buffing steel, brass, aluminum, magnesium, nickel and diecastings. Sturgis Products Co., 536 Jacobs St., Sturgis, Mich.

Roto-Louvre: Foundry mold heat dryers and coolers. Link-Belt Co., 302 W. Pershing Rd., Chicago.

Rotomarker: Marking machines. Acromark Co., 915 Morrell St., Elizabeth 4, N. J.

Roto-Matic: Continuous operating, high production milling, drilling, reaming, boring and threading machines of a non-indexing type. Davis & Thompson Co., 6411 W. Burnham St., Milwaukee 4.

Rotomatic: Rotary vapor degreaser. Phillips Mfg. Co., 3440 W. Touhy Ave., Chicago 45.

Roto-Met: Centrifugal castings in ferrous or nonferrous metals. Roto-Met Centrifugal Casting Corp., 4300 W. Monarch Place, Milwaukee 8.

Rotory Bearing: Genuine babbitt metal. H. Murdoch & Co., Frick Bldg., Pittsburgh.

Rotoscoop: Sand dewaterer. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Ro-Twin: Two-stage rotary air compressor or dry vacuum pump. Allis-Chalmers Mfg. Co., Milwaukee 1.

Roxaprene: Corrosion-resistant dip coating for steel products which dries in 20 min. Roxalin Flexible Finishes, Elizabeth, N. J.

Roxaprene: Corrosion-resistant coating for use as substitute for galvanized coatings on air-conditioning equipment, motor trucks, fans, blowers, pumps and special machinery. Roxalin Flexible Lacquer Co., Inc., Elizabeth, N. J.

RPM: See Calol.

Royal: High-temperature bonding mortar. Robinson Clay Products Co., Akron 9, Ohio.

Royal: Wire fence. American Steel & Wire Co., Cleveland 13.

Roylite: Preparation for cleaning metals. Hanson-Van Winkle-Munning Co., Matawan, N. J.

RR Alundum: Pure aluminum oxide for refractory and electrical insulation, lining, packing and cement materials. Norton Co., Worcester 6.

R-S "A" Metal: Cupola metal for applications involving hard abrasive wear and severe stresses. R-S Products Corp., Wayne Junction, Philadelphia 44.

R-S "H" Metal: Alloy semisteel for resistance against heat, abrasion and corrosion. For valves, etc. R-S Products Corp., Wayne Junction, Philadelphia 44.

R-60-T: Synthetic coating for brushing on belts; particularly useful for protection of outdoor conveyor belts from deterioration through action of sunlight and air. B. F. Goodrich Co., Akron, Ohio.

R-S Valves: Full line of butterfly valves. R-S Products Corp., Wayne Junction, Philadelphia 44.

R-301: Corrosion resistant aluminum alloy with Cu-Mn-Mg-Si; for aircraft parts and structures. Reynolds Metals Co., Louisville.

Rubberdisc: Special idlers equipped with rubber discs for use in cushioning shock at loading points of conveyors. Robins Conveyors, Inc., 270 Passaic Ave., Passaic, N. J.

10,000 TRADE NAMES

Rubel Bronze: Series of copper-zinc alloys containing Mn-Ni-Fe-Al for propellers, piston rings, valves, rotor covers, bearing bushings. Allgemeines Deutsches Metallwerk, G.m.b.H., Berlin, Germany; International Development Corp., 19 Rector St., New York.

Rubelit: Copper-zinc alloy with Mn-Ni-Fe-Al for bushings, piston bolts, valve guides. Allgemeines Deutsches Metallwerk, G.m.b.H., Berlin, Germany; International Development Co., 19 Rector St., New York.

Ruberex: Cushion tread composition wheels for industrial truck casters. Faultless Caster Corp., Evansville 7, Ind.

Ruggedwear: Resurfacer for concrete or wood floors. Flexrock Co., 3678 Filbert St., Philadelphia 4.

Rupresol: Rust preventing solution to be used in the coolants for machinery or in immersion solutions. Machinery Supplies Co., 501 Madison Ave., New York.

Ruptair: Magnetic air circuit breaker. Allis-Chalmers Mfg. Co., Milwaukee 1.

Ruptor: Arc depotentiators for oil circuit breakers. Allis-Chalmers Mfg. Co., Milwaukee 1.

Ruralductor: Stranded steel electrical conductor. Bethlehem Steel Co., Bethlehem.

Ruscar: Antifriction bearings. Chas. Carr Ltd., Smethwick, Birmingham, England.

Ruscat: Rustproofing and cleaning solution for preparing metal surfaces before application of corrosion resisting paints, synthetic coatings, etc., and for rust-proofing iron or steel. United States Stoneware Co., 102 Talmadge Circle, Akron, Ohio.

Ruselite: Aluminum alloy with Cu-Cr-Mo for hardware and fixtures. Milwaukee Die Casting Co., 1027 N. 4th St., Milwaukee, Wis.

Ruselite: Corrosion-resistant aluminum alloy with Cu, Cr, Mo, Ti, for hardware and fixtures. Ruselite Corp., 1027 N. 4th St., Milwaukee 3.

Rushclene: Descaler for ferrous metals. Rushton Organization, 173, Clarence Gate Gardens, N. W. 1, England.

Rust Avert: Rust preventive. Turco Products, Inc., Los Angeles 54.

Rust Ban: Emulsion cleaner for metal products; used frequently with 5 pct water. Standard Oil Co. of New Jersey, 26 Broadway, New York.

Rust Bar: Rust preventive. Turco Products, Inc., Los Angeles 54.

Rust Evade: Rust preventive. Turco Products, Inc., Los Angeles 54.

Rust Foe: Oil-base rust remover. Rheem Research Products, Inc., Standard Oil Bldg., Baltimore 2.

Rust Remover: Removes rust and corrosion from most metal surfaces, apply with cloth, brush, spray or dip. Cities Service Oil Co., Bartlesville, Okla.

Rust Remover: For removing rust and tarnish. Cities Service Oil Cos., 70 Pine St., New York 5.

Rust-Veto: Corrosion-inhibiting mineral oil compounds, for rust prevention after black-

ening or Parkerizing. E. F. Houghton & Co., 307 W. Lehigh Ave., Philadelphia.

Rust Veto: Compounds of various viscosities in fluid, grease, waxy or drying types, for protection against metal corrosion during shipping or storage. Applied by brushing, dipping or spraying. E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33.

Rusta Restor: Cathodic rust prevention equipment. Johnston & Jennings Co., 891 Addison Road, Cleveland 14.

Rustless: 20 Cr stainless for oil burner sleeves, nozzles. Rustless Iron & Steel Corp., 1901 Edison Highway, Baltimore 13.

Rustless: More than 30 grades of stainless, heat and corrosion-resisting steels. Rustless Iron & Steel Div., American Rolling Mill Co., 3400 E. Chase St., Baltimore 13.

Rustproofer: An effective protection against corrosion for metals exposed to atmospheric conditions. Stonhard Co., 401 N. Broad St., Philadelphia 8.

Rustvoid: Rust-preventing compound. Rustvoid Products Inc., 11 Murray St., New York.

RX Gas: Prepared gas atmosphere for carburizing carbon restoration, dry cyaniding and high-carbon steel treatment. Surface Combustion Corp., Toledo 1.

Ryanite: Alloy Cr-Ni cast iron for dies and brake drums. Allyne-Ryan Foundry Co., Aetna & E. 91st Sts., Cleveland.

Ry-Arm: Alloy steel for armature shafts. Joseph T. Ryerson & Son, Inc., Rockwell and 16th Sts., Chicago 80.

Ry-Ax: Alloy steel for axle shafts. Joseph T. Ryerson & Son, Inc., Rockwell and 16th Sts., Chicago 80.

Rycase: 1 Mn free-cutting carburizing steel for screw stock, carburized parts. Joseph T. Ryerson & Son, Inc., Rockwell and 16th Sts., Chicago 80.

Ryco: Alloy steel for spindles, gears, tie-rods, studs, shafts. Joseph T. Ryerson & Son, Inc., Rockwell and 16th Sts., Chicago 80.

Ry-Co: Machinery steel in the heat-treated condition. Joseph T. Ryerson & Son, Inc., Box 8002-A, Chicago 80.

Ryertex: Phenolic resin laminated plastic used for industrial bearing applications of all kinds; oil, water, grease lubricated. Joseph T. Ryerson & Son, Inc., Box 8002-A, Chicago 80.

Rytense AA: Carbon alloy for gears, cams, arbors, rollers, shafts. Joseph T. Ryerson & Son, Inc., 2556 W. 16th St., Chicago 80.

S

S & G: Splines and gears. Spline & Gear Machine Co., 19380 Mt. Elliott St., Detroit 12.

SA-32: Low-alloy iron castings, resistant to growth, for parts for industrial furnaces, and general uses at 1000°-1400°F under conditions of limited thermal or mechanical shock. Sterling Alloys, Inc., Woburn (Boston), Mass.

SB Process: Method of zinc plating. Hanson-Van Winkle-Munning Co., Matawan, N. J.

Sabeco: Series of bearing bronzes with Sn-Pb for a wide range of service applications. Fredericksen Co., S. Waber at Agricola St., Saginaw, Mich.

Safe-Lock: Wire rope fitting for swaging to wire rope and aircraft cable. Macwhyte Co., 2911 14th Ave., Kenosha, Wis.

Safe-T-Head: Pins and rivets for chains. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Safe-Tie Anchors: High-heat duty prefired firebrick shapes used in the construction of Ramhite suspended arches, insulated suspended walls and air-cooled suspended walls. Ramtite Co., 2563 W. 18th St., Chicago 8.

Safety Circle: Induction motors. Allis-Chalmers Mfg. Co., Milwaukee 1.

Safety Swivel Socket: Weldless swivel socket containing no threads, furnished either in the open or closed type. John A. Roebling's Sons Co., Trenton 2, N. J.

Safety Walk: Non-skid floor covering for use around machinery, on loading docks and platforms wherever working conditions make footing hazardous. Minnesota Mining & Mfg. Co., 900 Fauquier Ave., Saint Paul 6.

Safkar: Grating products for railroads. Irving Subway Grating Co., Inc., 27th St. and 51st Ave., Long Island City 1, N. Y.

Saflex: Polyvinyl acetal plastic resins; for rubber substitutes for coating fabrics, lining containers and making molded fittings. Monsanto Chemical Co., Plastics Div., Springfield, Mass.

Safstep: Open steel grating-flooring. Irving Subway Grating Co., Inc., 27th St. and 51st Ave., Long Island City 1, N. Y.

Saf-T: Flame-proof welding curtains. Fred Jessar, 1230 Vine St., Philadelphia 7.

Safway: Assembly of standard lightweight, patented parts of high-tensile steel tubing, welded into rigid durable units. For exterior and interior scaffolding, rolling towers, material hoist towers, gantries, etc. Safway Steel Products, Inc., 6228 W. State St., Milwaukee 13.

Salbrick: Solid sal-ammoniac for tinning soldering irons. American Solder and Flux Co., Trenton Ave. & Norris St., Philadelphia 25.

Salem: All types and sizes of metal-heating furnaces. Salem Engineering Co., Salem, Ohio.

Salem: Elevator buckets. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Samson: Series of steels, some case hardening, for gears, shafts, clutch parts, turbine blades. Carpenter Steel Co., Reading, Pa.

Samson Shot: Alloy steel shot for cleaning metal products. Pittsburgh Crushed Steel Co., Pittsburgh, and Steel Shot & Grit Co., Boston.

Sanalloy: Domestic refrigerating unit finish. Westinghouse Electric Corp., East Pittsburgh, Pa.

Sanditioner: Aerator for foundry sand. Jeffrey Mfg. Co., 906-99 N. Fourth St., Columbus 16.

Sanditioner: Foundry sand conditioning equipment. Jeffrey Mfg. Co., 958 N. 4th St., Columbus 16.

Sandslinger: Foundry sand handling equipment for filling molds. Beardsley & Piper Co., 2543 N. Keeler Ave., Chicago.

Sandusky: Copper alloy with 5 Sn, 4 Zn, 5 Pb and 1 Ni for rolls, cylinders, liners, bushings. Sandusky Foundry & Machine Co., Sandusky, Ohio.

Sandusky: See Chief Sandusky. Sandusky Foundry & Machine Co., Sandusky, Ohio.

Sandvik: Series of special irons and steels for electrical purposes, magnetic parts. Sandvikens Jernverks, A. B., Sandviken, Sweden.

Sankey: Foot, toe and shin protective equipment for protection against occupational hazards. Ellwood Safety Appliance Co., Box 551, Ellwood City, Pa.

Sanstorm: Sandblasting machines. Sandstorm Mfg. Co., Fresno, Calif.

Santicizers: Phthoyl glycollates used in finishes and coatings to impart flexibility and toughness. Monsanto Chemical Co., 1700 S. Second St., St. Louis 4.

Santomerse: Series of six salts of a homologous series of substituted aromatic sulfonic acids. Used as wetting, spreading, penetrating, emulsifying agents and detergents for metal cleaning and lubrication. Monsanto Chemical Co., 1702 S. Second St., St. Louis 4.

Saran: Colorful plastic for non-rusting screen cloth, chemically resistant pipe and tubing, protective packaging, and latex and resins for castings and finishes. Dow Chemical Co., Midland, Mich.

Satco: White metal for high speeds and heavy loads for bearings, cross-head gibs. National Lead Co., 113 Broadway, New York.

Satin Strip: 18-8 Cr-Ni cold-rolled stainless steel, for ornamental architecture. Acme Steel Co., 2838 Archer Ave., Chicago.

Savage (No. 1): Fire brick. Robinson Clay Products Co., Akron 9, Ohio.

Sav-A-Tool: Method of reclaiming old files. Sav-A-Tool Corp., 3582 Eastern Ave., Cincinnati 26.

Save-Lite: White paint of high light reflecting power for inside walls and ceilings of manufacturing plants. Sherwin-Williams Co. 101 Prospect Ave. N. W., Cleveland 1.

Saville: Ni-Cr stainless steels for general anticorrosion service. J. J. Saville & Co., Ltd., Sheffield, England.

Sawtooth Anodes: Lead anodes with angular surface for use in chrome plating. Heil Engineering Co., 12901 Elmwood Ave., Cleveland 11.

Scaiflux: Brazing flux. Scaife Co., Oakmont, Pa.

Schenck: Type elevator buckets. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Schrader: Cover for pneumatic tire valves and fittings, pressure gages, ice bags and syringe fixtures, and air-controlled devices. A. Schrader's Son Div., Scovill Mfg. Co., Inc., 470 Vanderbilt Ave., Brooklyn 17.

Sciaky: All types of flash-welding machinery. Sciaky Bros., Inc., 4913 W. 67th St., Chicago 38.

Scimitars: 18 Ni, Cu-Zn nickel silver for domestic utensils, ornaments. Barker & Allen, Ltd., Birmingham, England.

Scleron: Age-hardening aluminum alloy for small structural parts. Vereinigte Leicht-

metall Werke G.m.b.H., Hanover-Linden, Germany.

Scleron: See Aeron.

Scotch Tape: Pressure sensitive tapes for masking, sealing, insulating, protecting and identification, available with cloth, paper, cellulose or acetate fibre backing. Minnesota Mining & Mfg. Co., 900 Fauquier Ave., Saint Paul 6.

Scottsanizing: Method of case hardening stainless steels in a liquid bath. C. U. Scott Heat Treating Co., Rock Island, Ill.

Scottsonizing: Surface-hardened stainless steel having high hardness and wear resistance combined with good corrosion resistance. C. U. Scott Son, Rock Island, Ill.

Screenarator: Foundry sand conditioning equipment. Beardsley & Piper Co., 2543 N. Keeler Ave., Chicago.

Scru-Peller: Screw-feed centrifugal pump for liquids containing solids; cuts as it pumps. Chicago Pump Co., 2300 Wolfram St., Chicago 18.

Scrugun: Electric hand tool for driving smaller screws and threaded fastener; available with positive or adjustable clutch. Black & Decker Mfg. Co., Towson 4, Md.

Scrulug: Solderless lugs. Burndy Engineering Co., Inc., 107 Bruckner Blvd, New York 54.

Sea Cliff: Copper, brass and phosphor-bronze tubes, sheets, rods and wire. Charles Clifford & Son, Ltd., Birmingham, England.

Seal-Clad: Motors with stator windings sealed by Bakelite Shields. Allis-Chalmers Mfg. Co., Milwaukee 1.

Sealed-Disc: Filters for electroplating baths. Alsop Engineering Corp., 104 Bright St., Milldale, Conn.

Sealex Bushings: Combination of steel and steatite in the shape of transformer bushings having a very wide range of temperature. General Ceramics & Steatite Corp., Keasbey, N. J.

Sealite: Wood bolts, either self-countersinking, nonturning, waterproof, or integrally forged washer head. Lewis Bolt & Nut Co., Minneapolis 14.

Sealmet I: Steel for glass to metal seals. Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh.

Sealol: Seal for rotating shafts. Sealol Corp., 47 Willard Ave., Providence 5, R. I.

Sealol CB: Seal for rotating shafts. Sealol Corp., 45 Willard Ave., Providence 5.

Sealtex: Flexible, acid-proof, rubberized plastic used as protective coating for ducts, hoods, piers, structural work, etc., against acid fumes and corrosive gases. Nukem Products Corp., 122 Colgate Ave., Buffalo 20.

Searchray: Complete line of X-ray and diffraction equipment. North American Philips Co., Inc., 100 E. 42nd St., New York 17.

Seewasser Alloy: Aluminum alloy with Mg-Mn for resistance to marine corrosion; for furniture, wire, castings. Karl Schmidt Co., Neckarsulm, Germany.

Sea Steel: Stainless steel for marine fittings, hardware, pulleys. General Alloys Co., 401 West First St., Boston.

Sealmet: Fe-Ni-Cr alloy for glass-to-metal seals in radio tubes. Hygrade Sylvania Corp., 1 P. O. Sq. & 11 Lake St., Boston.

10,000 TRADE NAMES

Seamlex: Flexible metal hose. Seamlex Co., Inc., 43-29 24th St., Long Island City 1.

Sefco: Cast iron with Ni for gears, machinery parts. Sessions Foundry Co., Bristol, Conn.

Selectro: Vibrating screen shakeouts for foundry molds. Productive Equipment Corp., 2926 W. Lake St., Chicago.

Selectron Electric hoist control. Yale & Towne Mfg. Co., 4532 Tacony St., Philadelphia 24.

Selenium Copper: Copper alloy for electrical conductors. American Brass Co., Waterbury, Conn.

Selflube: Porous bronze and porous iron bearings, bushings, cams, etc., made by the powdered metal process. Keystone Carbon Co., Saint Marys, Pa.

Sems: Pre-assembled washer and screw units. Shakeproof, Inc., 2501 N. Keeler Ave., Chicago 39.

Sems: Lockwasher screws. Pheoll Mfg. Co., 5700 Roosevelt Rd., Chicago 50.

Seneca: Wire and wire products. Seneca Wire & Mfg. Co., Fostoria, Ohio.

Sensitrol: Dialed valve employing a variable equilateral triangular port for manually controlling oil flow to single industrial burners. North American Mfg. Co., 2910 E. 75th St., Cleveland 4.

Sentry Oils: For the lubrication of shop machinery. Cities Service Oil Cos., 70 Pine St., New York 5.

Sep-Aerator: For aerating foundry sand. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Serrabestos: Serrated solid metal gasket with asbestos composition sheet pressed into grooves; suitable for rough flange surfaces. Goetze Gasket & Packing Co., Inc., New Brunswick, N. J.

Service: Brand conveyor belts. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Serviron: Provides protection for the inner surfaces of water tanks and boilers, resisting corrosion, electrolysis, pitting, rust and fungus growth. Xzit Sales Co., 1029 Clinton St., Hoboken, N. J.

Servite: Protecting tubes for thermocouples, particularly for cyanide and salt baths. Claude S. Gordon Co., 3001 S. Wallace St., Chicago 16.

Servitex: Simulated leather in sheets, rolls, used in automobiles, luggage, furniture, book binding, etc. Cincinnati Industries, Inc., Cincinnati (Lockland).

Setskold: Refractory mortar. Laclede Christy Clay Products Co., Ambassador Bldg., St. Louis 1.

Seycast Nickel Anodes: Cast anode containing 99 pct plus nickel designed primarily for bright nickel baths. Seymour Mfg. Co., 502 Franklin St., Seymour, Conn.

Seymourite: Copper alloy with Ni-Zn for ornaments, electrical equipment. Seymour Mfg. Co., 502 Franklin St., Seymour, Conn.

Shamva: Mullite refractories for electric furnaces, roofs, ladles. Mullite Refractories Co., Shelton, Conn.

10,000 TRADE NAMES

Shaperite: 4 C, Mn steel for machinery parts. La Salle Steel Co., 919 N. Michigan Ave., Chicago.

Sharalloy: High-tensile steel of low alloy content used where increased or equal strength is desired with a reduction of weight. Sharon Steel Corp., Sharon, Pa.

Sharon: Railway car couplers. National Malleable & Steel Castings Co., Cleveland 6.

Sharon: Silica brick for high-temperature furnaces. Davis Fire Brick Co., Oak Hill, Ohio.

Sharon Stainless: Stainless steel for general use. Sharon Steel Hoop Co., Sharon, Pa.

Sharonsteel: Hot and cold rolled, stainless, high-carbon flat-rolled steels; special-coated steels. Sharon Steel Corp., Sharon, Pa.

Sharonsteel: Stainless, alloy, carbon steel, hot and cold rolled, all tempers and analyses, pickled, galvanized, or terne coated. Sharon Steel Corp., Sharon, Pa.

Shaw: Sand classifier. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Shawinigan: Carbide. Shawinigan Products Corp., Empire State Bldg., New York 1.

Shawinigan: Austenitic 18-8 stainless steel with 3 Mo for service in sulfite industry and chemical plants with strong acids. Shawinigan Chemicals Ltd., Montreal.

Shawinigan SSS: 35-15 Ni-Cr stainless for heat and corrosion-resistant castings and equipment. Shawinigan Chemicals, Ltd., Montreal.

Shed-Ore: Brackets for return idlers for belt conveyors. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Sheepbridge Stokes: Steel for centrifugal castings. Sheepbridge Stokes Centrifugal Castings Co., Ltd., Chesterfield, England.

Sheetweld: Welding electrodes for light sheet metal. Westinghouse Electric Corp., East Pittsburgh.

Sheffalloy: Used for collapsible tubes. New England Collapsible Tube Co., New London, Conn.

Shelblast: Ground apricot pits used for soft-grit blasting of cylinder walls, etc. Pangborn Corp., Hagerstown, Md.

Sheldon: Lathes, milling machines, jig borers, shapers. Sheldon Machine Co., Inc., 4258 N. Knox Ave., Chicago 41.

Shenango-Penn: Series of bronzes, brasses, nickel and iron alloys for bushings, bearings, pump liners, valve fittings, castings, hardware. Shenango Penn Mold Co., Dover, Ohio.

Sherardizing: Cementation process for improving corrosion resistance of steel by impregnating steel surface with zinc. N. J. Zinc Co., 60 Front St., N. Y.

Shield-Arc: Two types of steel welding rods. Lincoln Electric Co., 12818 Coit Rd., Cleveland.

Shield-Arc: Arc-welding machines of all types, motor generator, gas engine and diesel engine driven types. Lincoln Electric Co., 12818 Coit Rd., Cleveland 1.

Shield Arc 85: Arcwelding electrode for steel; corresponds to AWS E-7010. Lincoln Electric Co., 12818 Coit Rd., Cleveland 1.

10,000 TRADE NAMES

Shield-Arc LH-70: Electrode to simplify welding of high sulfur, free-machining steel and of certain high tensile, low-alloy steels. Lincoln Electric Co., Cleveland 1.

Shimer: Cutter heads, cutters, knives and bits, primarily for wood. Samuel J. Shimer & Sons, Inc., Milton, Pa.

Ship Brand: Stainless steels of the 18-8 and 13-Cr type for springs in service under corrosive conditions. Webb Wire Works, New Brunswick, N. J.

Shock Proof: Malleable castings. Lake City Malleable Co., 5000 Lakeside Ave., Cleveland 14.

Shori: Equipment for spraying molten metal; decorative work, building up worn machine parts, etc. Schori Process Corp., 8-11 43rd St., Long Island City, N. Y.

Short Pour Ladles: Combination of stands and special construction of blast furnace ladles to reduce splash of molten metal when pouring at the pig machine. William B. Pollock Co., 101 Andrews Ave., Youngstown.

Shotweld: System of and equipment for the fabrication of high-tensile steel. Edward G. Budd Mfg. Co., 2450 Hunting Park Ave., Philadelphia 32.

Shunt: Instrument for metering and controlling flow, pressure, etc., of liquids. Builders-Providence, Inc., 9 Codding St., Providence, R. I.

Shuntflo: Wholly mechanical low-priced flow meter for steam, air or gas. Builders-Providence, Inc., 9 Codding St., Providence, R. I.

Shur-Grip: Self-tapping screws. Parker-Kalon Corp., 200 Varick St., New York.

Shuster: Wire straightening and cutting machines. F. B. Schuster Mfg. Co., Inc., New Haven, Conn.

Sicromal: Special Cr-Al-iron alloy with very low S, P, O; for superheater and recuperator tubes, furnace parts. Vereinigte Stahlwerke, Dusseldorf, Germany.

Silcrome: Series of heat and corrosion-resistant high-carbon 17 Cr stainless for chemical service and furnace parts. Allegheny-Ludlum Steel Corp., Oliver Bldg., Pittsburgh.

Sicromo: Alloy steel. Timken Roller Bearing Co., Steel & Tube Div., Canton, Ohio.

Sicromo: 2.5 Cr, 0.5 Mo alloy steel with Si-Mn, for refinery tubes, stills, condensers. Timken Steel & Tube Co., Canton, Ohio.

Siemens-Halske: Corrosion resisting alloys with nickel and 5-30 tantalum for spark plug electrodes and heat and corrosion resisting parts. Siemens & Halske, A. G., Berlin, Germany.

Sifbrass Brazing Strip: Cu alloy for brazing. Suffolk Iron Foundry, Stowmarket, England.

Sifbronze: Series of bronzes for welding rods. Suffolk Iron Foundry, Stowmarket, England.

Sifcoloy: Erosion-resistant Fe alloy for nozzle castings, lock gate valves. Spuck Iron & Foundry Co., 3145 N. 14th St., St. Louis.

Sifonil: Welding rod. Suffolk Iron Foundry, Stowmarket, England.

10,000 TRADE NAMES

Sifsilcopper: Welding rod for copper. Suffolk Iron Foundry, Stowmarket, England.

Sigeron: Nickel cast iron. Prescott Co., Menominee, Mich.

Sigmalumin: Aluminum alloy with Cu-Mn-Si, for general applications. Aluminium Belge, S. A., Liege, Belgium.

Silal: High-silicon cast iron with Mn-Al, for stove and furnace parts, fire bars. Sheepbridge Stokes Centrifugal Casting Co., Ltd., Chesterfield, England.

Silal V: Aluminum alloy for light alloy parts in rolling and extrusion. Edward Hueck, Ludenscheid, Germany.

Silbereisen: Alloy cast irons with high Si, Ni, Cr, Mn for cast iron cylinders, pump bodies, acid resisting castings. Vereinigte Stahlwerke, Dusseldorf, Germany.

Silco: Glass-base inorganic coating, applied by spraying and baking at 350°F; highly resistant to heat, corrosion, impact and abrasion and obtainable in colors. Mitchell-Bradford Chemical Co., 2446 Main St., Bridgeport, Conn.

Silferal: Silicon-bearing aluminum alloy for cylinder heads, motorcycle cylinders. Aluminiumwerke Maulbronn, Maulbronn, Wirtt, Germany.

Silflux: Flux for silver soldering (boron compound) steel and non-ferrous metals. Eutectic Welding Alloys Co., 48 Worth St., New York.

Silver-Ply: Mild-steel sheets and plates bonded with stainless steel of 3 to 50 pct of total thickness. For manufacture of cooking vessels, storage tanks, marine equipment. Jessop Steel Co., 202 Green St., Washington, Pa.

Silmalec: Age hardening Mg-Si aluminum alloy for general applications. Jas. Booth & Co., Ltd., Birmingham, England.

Sil-O-Acid: Special Cu-Co-Si-Mg alloy to resist acetic, carbolic, sulfuric and tartaric acids in chemical industry service. Scientific Alloys, Inc., Los Angeles.

Silumin: 13-Si aluminum alloy for cylinders. Vereinigte Leichtmetall Werke, G.m.b.H., Hanover-Linden, Germany.

Silumin-Beta: Master alloy for the production of silumin gamma, aluminum with 12 Si, 0.3 Mg, 0.5 Mn. Metallgesellschaft, A. G., Frankfurt, a/M, Germany.

Silumin Gamma: Tough, corrosion-resistant aluminum alloy with 12 Si, Mg-Mn for dynamos, motors. Metallgesellschaft, A. G., Frankfurt, a/M, Germany.

Sidekar-Karrier: Carrier-Conveyor for handling bulk materials with minimum degradation. Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6.

Sil-Carb: Silicon-carbide belt, sheet and general-purpose abrasives. Clover Mfg. Co., Norwalk, Conn.

Silcaz: Alloy of silicon, calcium, zirconium, and boron used for improving hardenability, ductility, and impact resistance of steels. Electro Metallurgical Co., 30 E. 42nd St., New York 17.

Silcrome. Valve steels for internal combustion engines. Allegheny-Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22.

(To be continued next week)

Weekly Gallup Poll

(CONTINUED FROM PAGE 111)

(3) Follow a policy halfway between the two."

The results of the poll:

	Pct
Should go more to left	14
Should go more to right	20
Should keep middle-of-the-road	56
No Opinion	10

There has been a marked shift in thinking about what course voters believe the President is now following.

While the division of vote on the course they want him to follow is virtually the same as last year, far fewer people today think the President is moving to the left than was the case last year about this time. A greater proportion think he is moving along the middle-of-the-road, or leaning to the right than was the case last year.

These facts are shown in the following table, in reply to a second question asked in the poll:

"Which of these three policies do you think President Truman is now following?"

The replies:

	Today Pct	Last Year Pct
Think policies have been to left	19	44
Think policies have been to right	22	13
Think policies have been middle-of-the-road	37	27
No opinion	22	16

Majorities in both parties want to see Mr. Truman follow a middle-of-the-road policy, and the largest blocs in each group also think he is doing so. This is shown as follows:

	Policy Being Followed	Policy Voters Want
DEMOCRATS	Pct	Pct
To left	15	18
To right	25	12
Middle-of-the-road	37	60
No opinion	23	10
REPUBLICANS	Pct	Pct
To left	23	9
To right	21	29
Middle-of-the-road	36	53
No Opinion	20	9

That Mr. Truman is now thought to be following a middle-of-the-road course supplies an answer to a phenomenon observed by many commentators; Mr. Truman's failure to excite either as fanatical support or as intense an opposition as President Roosevelt.

Documentation of the point is

to be found in a table showing replies of Republicans and Democrats to the question of approving or disapproving the kind of job the President is doing.

The question about Mr. Roosevelt was asked when he was in office in early 1941, and again recently in connection with Mr. Truman.

The replies:

DEMOCRATS	App. Pct	Disap. Pct	No Op. Pct
Roosevelt	91	5	4
Truman	59	30	11
REPUBLICANS	**App. Pct**	**Disap. Pct**	**No Op. Pct**
Roosevelt	33	54	13
Truman	41	46	13

London Economist

(CONTINUED FROM PAGE 115)

runs through the Russian area of Porkkala.

But at any moment these concessions may be withdrawn and new conditions imposed. The Control Commission is to remain in Finland for 18 months after the ratification of the treaty.

Whether Finland can survive as a free democracy in the postwar world seems to depend on Russo-British relations, on the readiness of western governments and banking houses to grant credits and loans, and on the continued steadiness of the Finns themselves. On this last point there need be least doubt; the privations the Finns have endured and the efforts they have made during these last few years have proved their capacity.

Discloses Additional Data on New Reverse Current Electroplating

Pittsburgh

• • • **Additional details on an** electroplating process in which finishing costs are reduced 20 pct or more while the resulting product has better quality and a finish fully equal to that produced by older methods was described by George W. Jernstedt, manager of electroplating projects for the Westinghouse Electric Corp. at a recent meeting of the American Electroplaters Society in Pittsburgh.

It is similar in technique to that of a master painter who, after making a stroke with his loaded paintbrush, then draws the brush back again to remove excess paint and produce a finish free of brush marks. In the new plating process, current is reversed periodically to remove surplus or unsound metal, level peaks, and polish. Loose or surplus plate is "wiped" off by these electrical backstrokes, leaving only the smooth, tightly fastened atoms. Successive layers of plate can be built up by this method to almost any desired thickness to make a deposit more dense and of greater homogeneity than that possible with conventional continuous-current methods.

Using the Periodic Reverse-Current method, it is possible to produce a plate that is considerably smoother than the surface of the material to which it is applied. For example, a film of copper only .0015-in. thick has been plated on shotblasted steel with no evidence of the rough base metal being apparent at the surface of the copper plate. Burned electrodeposits, nodules, exaggerated buildup of metal at corners or at sharp points —all common in other plating methods—can be reduced or eliminated when the new process is used.

The company states greater speed is obtained in the Periodic Reverse-Current method of plating mainly because stronger current can be used in the plating portion of the cycle. Since the metal surface is brightened by the current reversal, hand buffing or polishing can be cut down or eliminated entirely in many cases.

The new process works better with some electrolytes than with others, it was said. Plating baths best suited for its use are the cyanide-type baths such as copper, silver, zinc, cadmium and even gold. In general, definite and substantial improvement is evident with the new method in most acid and alkaline electrolytes. The speaker emphasized that such factors as temperature, metal concentration and alkalinity or acidity of the solution must be carefully studied to obtain the best results for each adaptation.

Magnetic Separator Plant Abandoned Due To High Recovery Cost

Portland, Ore.

• • • **High costs of recovery** are said to be responsible for the abandonment of the magnetic separator plant south of Coos Bay, originally built at a cost of $625,000 for extracting chromite from black sand found there in a deposit known as the Seven Devils District.

The black sands of the Oregon Coast have long been considered as a potential source of gold, platinum, chrome and possibly other valuable metals and during the extreme shortage of the latter metal during the war, C. F. Corzelius, a Texas oil man, began construction of a chrome magnetic separator plant which was later taken over by the U. S. government.

The magnetic separator and the concentration plant operated only 7 months and during that period approximately 70,000 long tons of concentrate were turned over to the Defense Plant Corp.'s separator which then produced 10,000 tons of approximately 38 pct concentrate.

George L. Maynard, in present charge of the shutdown separator plant, reports that mining operations and concentrating it to 25 pct cost approximately $10 a ton and that the magnetic separator plant was able to turn out one ton of 38½-pct concentrate for every two tons furnished to it by the primary plant. The two tons of raw material are said to have cost $20 and the process of concentrating them $15 additional which made the finished product cost approximately $35 per ton, it is reported. The market value of the chromite at that time was less than $10 a ton and obviously the operation could not be economically continued.

Introduces Mineral Bills

Washington

• • • **A National Mineral** Resources Div. would be created within the Dept. of Interior under a bill (HR-1284) sponsored by Rep. Richard F. Harless (D-Ariz.). Its purpose would be to coordinate and control the work of all gov-

ernmental agencies concerned with development and conservation of mineral resources.

Another measure (HR-1285) introduced by Mr. Harless would reimburse "net losses" incurred by the mining industry by reason of furnishing strategic and critical minerals and metals for the prosecution of the war during the emergency period Sept. 8, 1939 to Sept. 1, 1945.

Other mining legislation introduced since the convening of Congress includes measures which would make permanent the wartime depletion allowance on bentonite (HR-662) by Rep. Frank A. Barrett (R-Wyo.) and also fluorspar (HR-296) by Rep. George C. Schwabe (R-Okla.).

For Sale, a Town

Washington

• • • For Sale: One complete town, population 2500. Credit extended. Apply War Assets Administration.

Dragerton, a town in Carbon Co., Utah, developed by the government in 1943 at a cost of $4½ million for housing employees of the Geneva Coal Mine, has been put on the block by WAA which has other things to worry about besides running a town.

Occupying 377 acres of former farmland, the town is complete with more than 600 dwelling units, a general store, a theater, a hospital, school, one automobile, 5 dump trucks, one electric clock, a laundry and many other facilities conducive to pleasant living.

It isn't a white elephant likely to become a ghost town, either, WAA insists. Peacetime operation of the Geneva steel plant assures continued operation of the coal mine and WAA looks for even more housing units to be needed. Not wanting to paint a too glowing picture, however, WAA is quick to caution that Dragerton is too far removed from any industrial center for the purchaser to capitalize on the housing shortage.

The purchaser must have the interests of the town at heart, too, and take over the laundry equipment, the hospital (with complete operating room and equipment), the theater, the school, the church and other assets too numerous to mention.

Sealed bids should be forwarded to the Salt Lake City regional office to be opened and read at 2 p.m. (MST) on St. Valentine Day, Feb. 14.